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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, FEBRUARY 4, 1904 NUMBER 5

ESTABLISHED 1842. INCORPORATED 1888.

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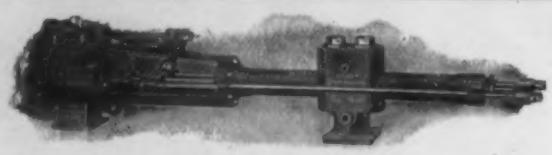

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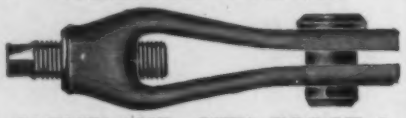

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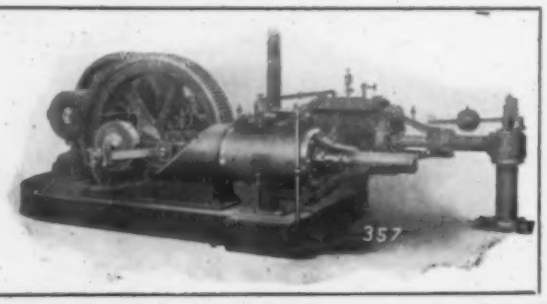

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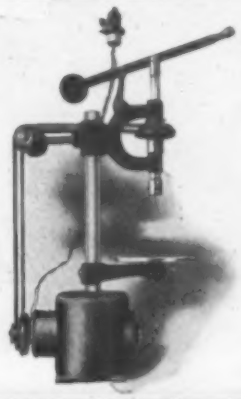

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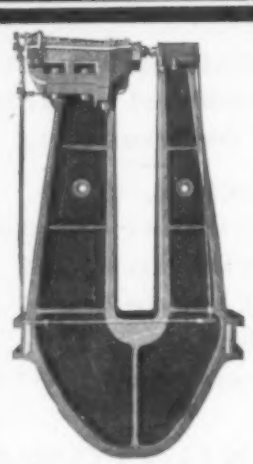

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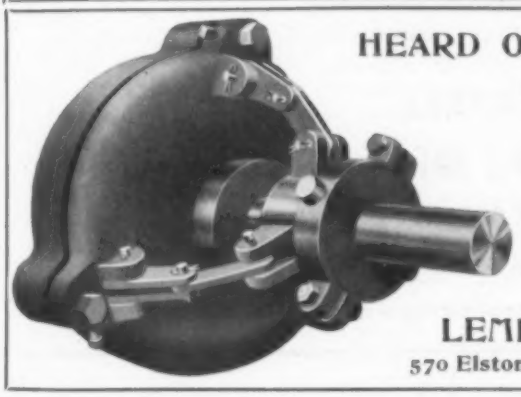

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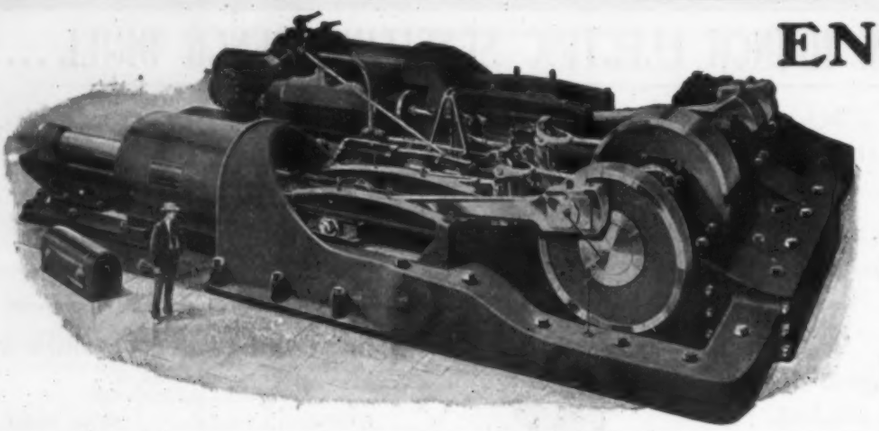

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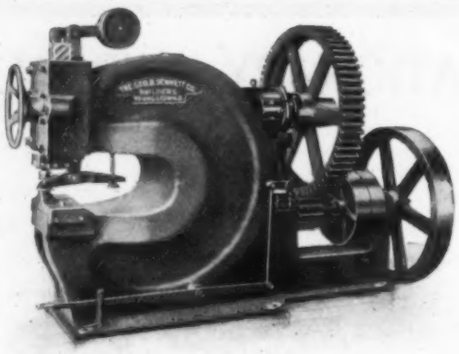

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, FEBRUARY 4, 1904 NUMBER 5

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Taking for granted the general conditions of much decreased consumption, as compared with the greater portion of 1903, and an absence of free buying or any incentive to it, the situation in the iron market is slightly better in some finished lines the past week. But no change in underlying conditions has appeared as yet, nor are there any indications of its early appearance. Consuming interests are evidently not persuaded that the structure of prices and of manufacturing costs in iron and steel products today is in proper relation to the readjustments now in progress in the country's business. While the iron trade itself may have seen the worst, so far as curtailment of production is concerned, in the closing weeks of 1903, there is still no definite assurance either as to tonnage or prices for 1904, and consumer and manufacturer together are feeling their way along from week to week, with every man's view of the future largely determined by temperament and individual experience.

The lighter finished products continue to have the most hopeful outlook. The comparatively large business of the wire mills would ordinarily be significant of good general consumption of iron and steel. The bar trade is also of good proportions, compared with some lines, reports from Chicago referring to the largest week's business in bar iron in twelve months. In sheets a better condition is expected to result from the action of the independent manufacturers at Pittsburg in the past week, in advancing prices $2 a ton. This is not by reason of any improvement in demand, but the consensus of opinion is that while present prices of steel prevail, only loss could result from sales at 2.20c for No. 28 black sheets. The wrought pipe trade, which is regarded a fair criterion, is in promising condition. Pipe line work, it is reported, will make important demands on the mills this year, and the business booked in merchant pipe has been such that the leading manufacaurer has anounced a one-point advance in the past week. The dissolution of the hoop and band association is announced this week. Prices have been irregular for some time through cutting of agreed prices. There is still a probability of an agreement on cotton tie prices for 1904, however. The Cold Rolled Strip Steel Association has reduced its prices $6 a ton.

The most noteworthy development of the week is the appearance of new demand from railroads for cars and locomotives. While at nothing like the rate of two years ago, this business is welcomed as a break in the long lull. The volume of orders that follows in the next few weeks will determine whether it is merely a spurt or the beginning of a movement. Rail business, while not large, gave better indications in the week. In foreign business 40,000 tons for the Canadian Pacific, taken by the Pennsylvania Steel Co., presumably at $21.50, Montreal, 7,500 tons for Argentina, to be rolled at Sparrow's Point, and 5,000 tons for Korea taken by the Carnegie Steel Co., are the principal items. The Lackawanna Steel Co. booked a 10,000-ton contract from a Western road and Chicago reports 10,000 to 15,000 tons of trolley road business, with a number of inquiries from steam roads pending. Structural steel tonnage is slow in developing. The American Bridge Co. booked 23,000 tons in January, while 40,000 tons is considered normal. Severe weather has prevented much work. In the Pittsburg district the settlement of building trades strikes paves the way for renewed activity, and considerable work is pending.

Foundry iron gives the least encouragement of all departments of the trade. Northern irons are weaker, and business does not come out. Southern makers, while well booked for February and March, are getting little new business and have little hope of more unless they cut well below $10, Birmingham. Some of them are now willing to take orders at this figure for the entire first half. The project for consolidation of the three leading Southern interests is being taken more seriously and the appraisal of the properties by experts is being arranged for.

The pool price for steel billets is still being cut by outside interests, and there are evidences of evasion of the agreement by members of the association, but the small amount of business done has made these less significant than they might be under some conditions.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 439 PARK BUILDING, Feb. 3.

A considerable improvement is noted in finished lines over conditions prevailing a week ago, and while the majority of the orders call for a small tonnage only, they are growing in number and the amount of inquiry is better than at any time in the past six months. Iron and steel bars continue in good demand and consumers while ordering small lots only in most cases insist on prompt deliveries, indicating that their stocks are entirely depleted. The wire and wire nail mills are working at their utmost capacity to fill the orders for the spring trade while the condition of the merchant pipe trade is exceedingly satisfactory, the tonnage for January having greatly exceeded that closed during the same month last year. Steel car plants are specifying more heavily and all report inquiries from the railroads, indicating that the buying of steel cars, which was practically shut off a year ago, will be resumed shortly.

On the other hand the Northern pig iron market continues to grow weaker. Foundry irons have suffered still further declines, one lot of 1,000 tons of No. 2 having been sold at $13.15, Pittsburg. The prevailing quotations for the best grades range from $13.50 to $13.60, while as high as $13.75 has been paid. Forge iron is also somewhat weaker, one sale of 1,000 tons having been made for Pittsburg delivery at $12.75, but another sale of 750 tons is reported at $13. The spread between foundry and forge is constantly growing smaller, due no doubt to the better demand for the latter in this market at the present time.

Within the week the Cold Rolled Strip Steel Association has reduced prices $6 per ton, while on the other hand the largest producer of pipe has made a one point advance on merchant sizes. The American Hoop and Band Association, whose membership consisted of the steel mills producing hoops, bands and cotton ties, was dissolved in the week and an open-market was declared on these products. Price cutting on the part of some members was alleged. While the last official price on hoops was on a 1.65c base and on bands 1.30c, these prices have been shaded on desirable business. Practically no business has been taken on cotton ties for this year's crop, although consumers will soon come into the market. No prices have been named, but as the annual consumption amounts to about 2,000,000 bundles it is believed that a price agreement will be entered into to cover this year's requirements. The Association of Independent Sheet Steel Manufacturers held a meeting

in this city last week at which general market conditions were discussed and an effort was made to establish a minimum price for sheets.

The largest rail order closed locally in the week was taken by the Carnegie Steel Co. for 5,000 tons of rails for shipment to Korea. The price was not given out, but it was very considerably below the prevailing price for domestic delivery.

The billet situation continues perplexing to the trade and with rumors and reports of shading on the part of pool members consumers are not anxious to place orders for very large tonnages at the current quotations. The Ashland Steel Co., not a party to this agreement, continues to quote $21 for Bessemer billets at Ashland, Ky., and this price enables it to undersell the steel makers in the association in the Western market. There are reports of all kinds of attempts to evade agreed quotations on billets, sheet and tin bars. It is reported that one contract was taken for a considerable tonnage of billets, the association price being specified according to the delivered schedule, but it was agreed that $3 per ton rebate was to be allowed for defective steel, the assumption being that the entire tonnage would be defective. Furthermore it is possible for some brokers to shade the quotations of the mills in the agreement from 50 cents to $1 per ton, and the only explanation of this is that the mills are giving dealers a much larger commission than is customary or are giving them the steel on a conversion basis. It is always hard to prove these evasions, as on their face such contracts indicate that the mill has received the official price for its steel; but that agreed quotations can be held until the next meeting in April is doubtful from present indications.

Pig Iron.—Foundry iron continues to grow weaker and the wonder is how some of the furnaces can name the prices they are making and not suffer an actual loss. While one sale of No. 2 was made at $13.15, Pittsburg, this seems to be the low point, $13.50 to $13.60 being the prevailing price. Southern iron cannot compete with Northern brands at these prices and there has been little Southern iron sold in this market except where it is desired as a mix, in the past month. We note the sale of 1,000 tons of forge at $12.75, Pittsburg, and another sale of 750 tons at $13. Southern basic is offered in this market at $13.05, but there is little buying. This week the Scottdale furnace of Corrigan, McKinney & Co., was blown in after an extended idleness, while the Youngstown Steel Co. and the Brier Hill Iron & Coal Co., Youngstown, O., are preparing to blow in their stacks this month. We revise quotations as follows:

Bessemer, Valley	$12 75 to 13 00
Bessemer, Pittsburg	13 60 to 13 85
No. 1 Foundry	14 00 to 14 25
No. 2 Foundry	13 50 to 13 75
Gray Forge, Pittsburg	12 75 to 13 00
Chilled Basic, Valley	12 50 to 12 75
Chilled Basic, Pittsburg	13 35 to 13 60

Steel.—Reports of evasions of the agreed prices on steel continue and while the producers deny all such reports flatly, there is little doubt that some buyers have concessions named them which practically amount to a cut. Agreed prices are as follows: Bessemer and open-hearth billets, 4 x 4 inches, and slabs, up to and including 0.25 carbon, $23, Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheet and tin bars are $1 per ton extra. Bessemer and open-hearth rods are still quoted at $30, Pittsburg.

Ferro-Manganese.—The market continues very quiet and prevailing quotations for domestic 80 percent range from $44 to $44.50, Pittsburg, with freight to points of delivery.

Spelter.—The spelter market declined slightly during the week and prime Western grades are held at 4.80c, Pittsburg, in carload lots.

Muck Bar.—Prime all-pig muck continues to command $26, Pittsburg. Muck carrying a large percentage of scrap is sold at slightly lower prices.

Skelp.—Sales of about 1,000 tons of skelp have been made during the week. Steel skelp, both grooved and sheared, is held at 1.40c to 1.45c, while grooved iron is quoted at 1.50c to 1.55c, and sheared at 1.55c to 1.60c.

Rails and Track Material.—The Carnegie Steel Co. this week closed an order for 5,000 tons of standard section rails for delivery to Korea. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; 16 and 20 pounds, $23 to $25; 25 to 40 pounds, $23 to $25. Track material: Spikes, 1.70c to 1.75c; track bolts, square nuts, 2.25c to 2.30c; hexagon nuts, 2.40c to 2.45c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 1.80c to 1.85c is asked.

Plates.—Specifications from steel car manufacturers are on the increase and inquiries from railroads are heavier than for some time. During the week the Pressed Steel Car Co. received an order for 200 steel cars. The demand for plates from the general trade is not heavy, however. We make the following quotations: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

Bars.—Demand for both iron and steel bars continues good, although it is reported that some of the smaller mills in the West are shading steel bars from 50 cents to $1 per ton. The largest producer of iron bars is quoting 1.35c, Pittsburg, and one order calling for 1,000 tons for delivery to July was taken on the basis of 1.40c, Youngstown. This concern will not take orders at 1.35c, Pittsburg, that are not accompanied by specifications and will not contract for future delivery at this price. We quote as follows: Bessemer steel bars, 1.30c; open-hearth, 1.40c; plow beams and cultivator beams, 1.30c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.40c; common bar iron, 1.30c to 1.35c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops are quoted at 1.65c, full extras, in 250-ton lots and over, and 1.75c in less than 250-ton lots. Bands are quoted at 1.30c and take the bar extras.

Pipes and Tubes.—Demand for merchant pipe as well as line pipe is very heavy, the tonnage for January far exceeding that of January last year. While the independent mills are shading quotations, their concessions are having little effect in disturbing the general market. Demand for seamless tubing during the past month was also very heavy and the indications are that the pipe mills will have an unusually prosperous year. The National Tube Co. on Feb. 1, made a one point advance in merchant pipe. Discounts to consumers carload lots, f. o. b. Pittsburg, plus freight to distination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch	69	59	66	56
½ inch	72	62	69	59
¾ to 6 inch	76	66	73	63
7 to 12 inch	71	61	68	58

EXTRA STRONG, PLAIN ENDS.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ to 8 inch	68	58	64	54

DOUBLE EXTRA STRONG, PLAIN ENDS.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛ to 8 inch	60	50	56	46

BOILER TUBES.

	Steel.	Iron.
1 to 1½ inch	42½	39
1¾ to 2¼ inch	55½	38
2½ inch	58	43
2¾ to 5 inch	64½	50½
6 to 13 inch	55½	38

Structural Material.—Little new business is being placed and the market continues quiet. We quote: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Independent mills continue to name low

prices on sheets, as low as 2.20c, having been done at mill for No. 28 guage. The largest producer, however, is not meeting this price, 2.30c, it being claimed, being the lowest price named on this gauge. On 500 bundle lots and over for one-pass black sheets we quote: No. 30, 2.75c; No. 29, 2.65c; No. 28, 2.25c to 2.30c; No. 27, 2.15c to 2.20c; Nos. 25 and 26, 2.10c to 2.15c; Nos. 22 and 24, 2.05c to 2.10c; Nos. 18 and 20, 2c to 2.05c; Nos. 14 and 16, 2.05c; Nos. 10 and 12, 1.75c to 1.80c. Galvanized, Nos. 10 to 17, 2.40c to 2.45c; Nos. 17 to 22, 2.60c to 2.65c; Nos. 22 to 25, 2.80c to 2.85c; Nos. 25 and 26, 3c to 3.05c; No. 27, 3.20c to 3.25c; No. 28, 3.40c to 3.45c; No. 29, 3.80c to 3.85c; No. 30, 4.30c.

Merchant Steel.—The Cold Rolled Strip Steel Association last week reduced the strip steel base $6 per ton. Strip steel 1-10 of an inch and thicker containing from .10 to .19 carbon has been reduced from $3.40 to $3.10 for hard and from $3.55 to $3.25 for soft. These prices apply to five ton lots and over. We quote turned, cold rolled and ground shafting, 52 off in carload lots and 47 percent off in less than carload lots. Tire steel, 1.50c, base; spring steel 1.90c to 2c; toe calk, 1.85c base. Tool steel is quoted 6 cents and upwards, according to the grade.

Old Material.—Demand for heavy melting stock continues good and we note the sale of 1,000 tons for Eastern shipment at $14, delivered. The stock was carried at a point near the mill so that the freight is very small. Cast scrap is not in heavy demand as the foundries are not using much at present.

Coke.—There is a slightly better call for both foundry and furnace coke, but prices have not improved. Connellsville furnace is held at $1.50 at the ovens and foundry at $2 to $2.25. For the week ending Saturday, Jan. 23, the production of the Connellsville region increased nearly 50,000 tons over the production of the previous week. During that week nearly 2,000 idle ovens were fired. The production of the upper region amounted to 171,855 tons, a gain over the previous week's production of 42,198 tons. The production of the lower region amounted to 43,261 tons as compared with 38,049 the previous week.

Wire and Wire Nails.—Mills are operating at their utmost capacity on orders taken during the month of January for the spring trade, and general market conditions continue favorable. Cut nail demand is not very heavy, however. We make the following quotations: Wire nails, carload lots, to jobbers, f. o. b. cars Pittsburg, $1.85 base; plain wire, carload lots, $1.75, base; barb wire, carload lots, $2.15, base; staples, carload lots, $2 keg. Galvanized, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel and iron cut nails, carload lots, $1.70, and less than carload lots, $1.75, f. o. b., Pittsburg, plus freight to point of destination. Terms, 60 days less 2 percent off in 10 days.

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Feb. 2.

There has been some informal discussion within a few days among ore producers concerning prices for this year, but nothing definite has come out of it. Widely different views are entertained and several interests are inclined to oppose regulation of prices by agreement, or the maintenance of an association for any purpose except collecting statistics. A meeting will be held this week to consider the entire subject. The prices fixed last year were as follows: Old range Bessemer (56.70 percent iron natural, .045 phosphorus), $4.50; old range non-Bessemer (52.80 percent iron natural), $3.60; Mesabi Bessemer (56.70 percent iron natural, .045 percent phosphorus), $4; Mesabi non-Bessemer (52.80 percent iron natural), $3.20.

Pig Iron.—Inquiries have been more numerous, some coming from large concerns including one of good tonnage for radiator work, and indicating that orders may soon be placed, but sales are not yet either numerous or large and prices have not improved. Competition has not been so active for a few days, probably because so little actual business was in sight. In Cleveland, the usual quotation at furnace is $13, for No. 2, but a few sales of small lots have been made at $13.25 to $13.50. The usual quotation in the Valley is $12.50 for No. 2. Southern iron is firm at $9.75 to $10, Birmingham, for No. 2. Owing to heavy sales made during the last two months of 1903, some of the Southern furnaces are now behind in their deliveries. We quote as follows for Cleveland delivery, save on Northern gray forge, which is at Valley furnace:

Bessemer	$13 85 to 14 00
No. 1 Strong Foundry	13 50 to 14 00
No. 2 Strong Foundry	13 00 to 13 25
No. 3 Foundry	12 25 to 13 00
No. 2 Southern	13 60 ot 13 85
Gray Forge, Valley furnace	11 50 to 12 00
Gray Forge, Southern	11 85 to 12 00
Lake Superior charcoal	16 00 to 16 50

Finished Material.—The bar iron market is not quite so irregular, as the smaller producers, who were selling at 1.20c at their plants, are not so prominent, and the larger producers have succeeded in taking a fair number of orders at 1.30c, Youngstown. Mills are still badly in need of orders, there is some complaint of inability to buy scrap at reasonable prices, and, on the whole, the condition of the bar iron market is not satisfactory. The price of 1.30c for Bessemer bars and 1.40c for open-hearth is maintained, specifications are coming in satisfactorily and a fair number of sales are being made. Pipe manufacturers have reduced discounts on merchant pipe one point. Owing to the withdrawal of the United States Steel Corporation from the hoop pool, developments in that market are expected. Sheets are more active. Prices of the principal producer through jobbers are as follows: Mill sales of black sheets, No. 10, 1.75c; No. 11-12, 1.80c; No. 14, 1.85c; No. 16, 1.95c; No. 27, 2.20c; No. 28, 2.30c. Galvanized, 75, 10 and 7 off. Out of stock prices are as follows: No. 10, 2.10c; No. 12, 2.15c; No. 14, 2.20c; No. 16, 2.30c; No. 18-20, 2.40c; No. 24, 2.45c; No. 25-26, 2.50c; No. 27, 2.55c; No. 28, 2.65c; No. 30, 3.10c. Galvanized out of stock, No. 16, 75 and 7½ off; No. 18-20, 75 and 10 off; No. 22-28, 75, 10 and 2½ off.

Jobbers, who, as a rule, have reported the market extremely dull, now say there is a slight improvement in nearly all lines.

Old Material.—The market is firm at the advanced prices quoted last week and stove plate is 50 cents higher. The extremely cold weather has prevented the collection of scrap and has helped to make the market stronger. A favorable indication is the fact that large consumers of scrap are buying more freely. We revise quotations as follows for gross tons, Cleveland:

Old iron rails	$16 00 to 17 00
Old steel rails (over 6 feet)	13 00 to 14 00
Old steel rails (6 feet and under)	12 00 to 13 00
Old car wheels	13 00 to 14 00
Steel boiler plates	9 00 to 10 00
Malleable iron (railroad)	11 00 to 12 00
Malleable iron (agricultural)	9 00 to 10 00
Heavy steel	12 00 to 13 00

We quote the following net tons:

No. 1 R. R. wrought	$12 00 to 13 00
No. 1 busheling	11 00 to 12 00
No. 1 machine cast scrap	12 00 to 13 00
Iron axles	16 50 to 17 50
Axle turnings	9 00 to 10 00
Wrought turnings (free from cast)	7 00 to 8 00
Uncut wrought iron boilers	5 00 to 6 00
Grate bars	8 00 to 9 00
Pipes and flues (clean)	10 00 to 11 00
Tank iron	9 00 to 10 00
Hoop and band iron	5 00 to 6 00
Sheet iron	4 00 to 5 00
Wrought drillings	7 00 to 8 00
Stove plate	9 00 to 9 50
Steel axles	13 00 to 14 00
Cast borings	4 00 to 5 00

CINCINNATI.

Feb. 2

The coke market is fairly active at easy prices. Foundry coke is selling at $2 to $2.25 f. o. b. ovens but the average of sales is about $2.10 at the ovens.

Pig Iron.—The week has developed nothing of importance. There is not much foundry iron selling and the sales are confined to miscellaneous lots of iron including off grades, gray forge and basic. There has been some

buying of basic by a Chicago concern and this same company is in the market for 2,000 tons per month for delivery in March, April and May. The Ohio furnaces are still holding $12.50 for No. 2 foundry at furnace as a basis and some are maintaining that figure as a minimum. There has been very little business to figure on and the market was a decidedly quiet one. In Southern irons there is an easier tone and $9.75, Birmingham, for No. 2 foundry is becoming the general quotation instead of the exception. It is believed that the lack of orders during January has made the Southern furnaces less optimistic in their view of the situation and that they are inclined to look upon the market as not so firm. There have been some requests from melters who bought iron for first quarter to hold back deliveries. There is no quotable change in prices but the feeling in the market is easy. Current prices f. o. b. Cincinnati, are:

Southern Foundry No. 1	$13 00 to 13 25
Southern Foundry No. 2	12 50 to 12 75
Southern Foundry No. 3	12 00 to 12 25
Southern Foundry No. 4	11 50 to 12 00
Southern Foundry No. 1 soft	13 00 to 13 25
Southern Foundry No. 2 soft	12 50 to 12 75
Gray forge	11 25 to 11 50
Northern Foundry No. 1	14 15 to 14 65
Northern Foundry No. 2	13 65 to 14 15
Northern Silvery (8% silicon)	16 15 to 16 65
Southern car wheel iron	17 50 to 18 00

Finished Material.—The demand is steadily improving and there is more inquiry. Prices seem to be steadier and there is a better feeling all along the line. Iron bars are now quoted at 1.35c to 1.40c f. o. b. Steel bars continue to be quoted at 1.43c base, half extras, with the retail price 1.75c to 1.90c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 and 5 and 2½ percent off. We quote black sheets, No. 27, at 2.45c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.90c; No. 27, 2.80c; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.35c; No. 10, 2.30c. Tank plates are easy and sell out of store at 2c for ¼-inch and 2.10c for 3-16-inch. Beams and channels are quoted at 1.90c to 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe there is a stronger tone to the market and the leading interest has announced an advance in the smaller sizes. We revise quotations in accordance with these advances. There is no change in boiler tubes.

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	67.7	57.7	64.7	54.7
½ inch	70.7	60.7	67.7	57.7
¾ to 6 inch, inclusive	74.7	64.7	71.7	61.7
7 to 12-inch inclusive	69.7	59.7	66.7	56.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1¼ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—The market is firmer and quotations are higher on all descriptions except No. 1 railroad wrought. We quote:

Old No. 1 railroad wrought, net tons	$10 00 to 10 50
Cast machine and foundry, net tons	11 50 to 12 00
Old iron rails, gross tons	17 00 to 18 00
Old steel rails, gross tons	13 00 to 14 00
Old short lengths, gross tons	11 00 to 12 00
Old iron axles, net tons	15 50 to 16 50
Stove plate, net tons	9 50 to 10 50
Wrought turnings, net tons	7 00 to 7 50
Cast borings, net tons	5 00 to 6 00

Inasmuch as the pig iron and coke business of Thomas A. Mack & Co., of Cincinnati, has been carried on for several years and owned exclusively by L. F. Walter and B. A. Wallingford Jr., the members of the firm have decided to adopt the name of "Walter-Wallingford & Co.," the change taking effect Feb. 1, 1904. There is no change in the personnel of the firm.

PHILADELPHIA.

Feb. 2.

There is general agreement among buyers and sellers in this city that a change for the better cannot be expected in iron and steel unless a buying movement can be induced under the leadership of the rail trade. If a price of rails should be made that would induce free buying there would be a large increase in the demand for pig iron and it is believed other lines would be benefited. Unless the price of rails is reduced, the next three months will probably be very dull.

Pig Iron.—The market is dull and prospects are not encouraging. Prices show little change. Basic is firmer, as a number of requisitions have been sent in against old suspended orders. We quote: No. 1, X foundry, $15.50 to $16; No. 2, X foundry, $14.50 to $15; No. 2, plain, $14 to $14.25; Southern No. 2, rail shipment, $13.75 to $14; Southern No. 2, on dock, $13 to $13.50; Standard gray forge, $13.50 to $14; ordinary gray forge, $12.75 to $13.25; basic, $13.75 to $14.10.

Finished Material.—There is a fair demand for small lots, but large orders do not appear. We quote the following delivered prices: Best refined bar iron, 1.25c to 1.35c; tank plates, 1.73½c; angles, 1.50c to 1.60c; beams, channels 15-inch and over, 1.73½c.

Old Material.—The market shows more activity and prices are firmer. We quote: Old steel rails, $12.50 to $13.50; miscellaneous heavy steel, $12.25 to $12.75; old steel axles, $16 to $17; old iron axles, $18 to $19; old iron rails, $15 to $15.50; old car wheels, $13 to $13.50; choice R. R. No. 1, wrought, $15.50 to $16.50; country scrap, $13.50 to $14.50; machinery cast, $12.75 to $13.50; No. 2 light scrap (forge), $10 to $10.50; No. 2 light scrap (ordinary), $8.50 to $9, axle turnings, $10 to $10.50; wrought turnings, $9 to $9.50; cast borings, $7 to $7.25; stove plate, $10.50 to $11; wrought iron pipe, $11.50 to $12.50; boiler punchings, $15 to $15.50.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Feb. 2

Pig Iron.—During the past week there was less activity in pig iron than in the week previous. Sales by both Northern and Southern furnaces were only of moderate proportions, with the former leading, in the tonnage placed. The undertone of the market was weaker, and even among those who were inclined to take an optimistic view of the outlook at the beginning of the year, there was a feeling that the prospects now are not as bright. The fact is that the demand from consumers has fallen off perceptibly , since the new year opened. The notable exceptions to this are pipe foundries, which seem to be the one branch of the foundry trade with cheerful reports to offer. Other foundries only say they are doing a fair business at best. Prices of Northern irons at this writing are very irregular. Some furnaces give quotations that are a little higher than those they made a week ago, but with a majority of furnaces prices remain unchanged, while a few are quoting a little lower. In Southern irons, the $10 schedule for No. 2 at Birmingham is being shaded, and sales have been made ae $9.75. When the $10 basis was made, it was announced that it was only for delivery the first quarter, and tentative prices of $10.50 and $11 were made for the second quarter. During the week, however, several large furnaces went on record as willing to close contracts at $10 for the next six months. One large producer, however, is asking at least 50 cents per ton higher for that delivery. But as has been the case for weeks, buyers are contracting for supplies only as they need them. Nobody seems anxious to buy for forward delivery. Northern furnaces are still able to undersell Southern makers, and unless the latter reduce their prices, this is likely to be the case for several weeks to come anyway. New York prices are as follows: Northern No. 1X, $15.25 to $15.70; No. 2X, $14.75 to $15.20; No. 2 plain, $14.25 to $14.70; Southern No. 1 foundry, $13.75 to $14.25; No. 2 foundry, $13.50 to $13.75; No. 3 foundry, $12.75 to $13.25; No. 4 foundry, $12.25 to $12.75.

Billets.—Moderate sales are reported in this market, with pool prices shaded. During the week, shipments to Europe from Atlantic ports amounted to 2,808 tons.

Finished Iron and Steel.—In structural shapes, so far as contracts closed were concerned, the past week was the worst of the new year. Plenty of work is said to be

in sight, but there is no disposition shown to give out the orders. There are buildings in this city whose foundations have either been laid, or are being laid, but the steel has not been ordered. The leading interest booked about 23,000 tons during January. It considers 40,000 tons a normal month. In sheets, a weakening tendency has been noted, but the tonnage disposed of has been very small. Plates have picked up a little from the very poor demand since the opening of the year. In bars a slight improvement has also taken place, but good propositions easily command concessions. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; fire-box, ordinary, 1.94½c to 2c; refined iron bars, 1.40c to 1.45c; soft steel bars, 1.40c to 1.50c; steel sheets, in carloads, New York, No. 28 black, 2.45 to 2.50c; galvanized, 3.50c to 3.55c.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Feb. 2.

The marked activity in bars is one of the most conspicious features of this market. Both iron and steel bars are sharing in this demand, the tonnage closed in the past week being of very encouraging proportions. In the case of bar iron, the total sales exceeded those of any previous week in twelve months past, while the sales of steel have been of far greater proportions than for some time. The increasing firmness of the market for bar iron is largely responsible for the impetus that has been given to trading in this product; and the reports of a probable advance in steel, though without foundation, has no doubt encouraged buying of this material. Heavy rails are also in a better demand, contracts having been closed in the past week for from 20,000 to 25,000 tons, with inquiry for a much greater amount. In other respects, the market is without notable change from the condition reported a week ago, with the possible exception that in structural steel, the outlook for a good demand during the coming building season is bright. Several large office buildings are being figured upon, as well as a growing number of small structures; while the inquiry from railroads for iron and steel for the construction of cars and bridges is of larger proportions than it has been for some months. According to reliable authorities, various railroads are reported to be in the market for a total of 3,810 cars of all kinds, in addition to 1,160 cars which were ordered in the last two weeks. The New York Central is reported to have ordered 70 locomotives from the American Locomotive Co. and the Lake Shore 42 engines from the same concern, while the Wabash is reported to be figuring on 57 locomotives. These reports indicate some resumption of the activity of railroads in the matter of new construction which was marked two years ago.

Pig Iron.—Not for some time has this market been so devoid of life as during the week under review. From the standpoint of actual sales, it was probably the quietest week in many months. While prices are unchanged they are weak, and on a bona fide order for several hundred tons it is impossible to say what furnaces would do. Many believe such an offer would test the market severely and that some concessions would be made; but on extended shipments it is doubtful if furnaces would consider it just now except at higher prices. Both Northern and Southern furnaces are at present maintaining quotations on the basis of $14, Chicago, for local No. 2, and $13.85, Chicago, for Southern No. 2, though booking little business. The Southern iron that was selling at $9.75, Birmingham, has apparently all been disposed of, as that quotation has been entirely withdrawn from this market. Producers generally are not pushing matters very actively in this section, they and the foundrymen while closely watching the market, waiting for future developments. If the inquiry is any indication of future needs, however, the outlook may be said to be promising, for it includes some lots running into the thousands of tons. Most of these, however, are regarded as "feelers," as they are invariably withdrawn as soon as quoted upon. There is little iron to be had for delivery in the first quater, even if there was a demand for it, as only three furnaces are in blast in this territory—the Thomas, the Mayville and one Iroquois stack, while several leading producers in the South have withdrawn from the market on all foundry grades up to March. We quote:

Lake Superior Charcoal	$16 00 to 16 50
Northern Coke Foundry No. 1	14 50 to 15 00
Northern Coke Foundry No. 2	14 00 to 14 50
Northern Coke Foundry No. 3	13 50 to 14 00
Northern Scotch Foundry No. 1	15 00 to 15 50
Ohio Strong Softeners No. 1	16 80 to 17 30
Ohio Strong Softeners No. 2	16 30 to 16 80
Southern Coke Foundry No. 1	14 35
Southern Coke Foundry No. 2	13 85
Southern Coke Foundry No. 3	13 35
Southern Coke Foundry No. 4	12 85
Southern Gray Forge	12 60
Southern Mottled	12 35
Southern Silveries (4% to 6% Silicon)	15 35 to 15 85
Jackson Co. silveries (8% to 10% Silicon)	18 50 to 19 50
Alabama and Georgia Car Wheel	19 85 to 20 85
Malleable Bessemer	14 50 to 15 00
Basic Iron	14 35 to 14 85

Iron and Steel Bars.—The demand for these products during the week past has been of excellent proportions. All classes of buyers have been in the market, many closing for requirements for the next six months. Some of the contracts let were for amounts running into the thousands of tons, and the total week's sales were larger than for several months. So far as iron is concerned, mills are experiencing no trouble in holding the advanced quotations, and the possibility of an advance in steel bars arising from the circulation of reports that mills contemplated such action has brought many consumers into the market. Railroads have been good buyers as also were wagon, carriage and implement makers. From the pressing demands for prompt shipment made by many concerns, it is evidence that stocks in consumers' yards are low; and it is the belief of producers that the trade has decided that the present is a good time to buy, being further encouraged in this view by the fact that orders for their own product of finished machines, etc., are coming in more freely. We quote, Chicago delivery, mill shipments, carload lots, as follows: Bar iron, 1.40c to 1.45c, half extras; soft steel bars, 1.46½c, half extras, with 5c to 10c per 100 lb. extra for less than carload lots with the regular extras for less than a ton of a size; angles less than 3 x 3, 1.56½c base, half extras; hoops, 1.81½c full extras. The movement from store continues to be of good proportions, and we quote iron bars, 1.60c to 1.70c, base, full extras; steel, 1.60c to 1.70c, half extras; small angles, channels and tees, less than 3 x 3, 1.70c to 1.80c rates, half extras; hoops, 2.10c to 2.20 rates full extras.

Structural Steel.—Mill business is quiet and were it not for the activity in structural yards and among jobbers, the market would be classed as a dull one. But the brisk movement of stocks among the former is one of the most encouraging features of the trade in this city, and though the orders are usually for small tonnages, the aggregate amount is of respectable proportions. Many large building enterprises are under discussion, involving a consumption of steel shapes running into the thousands of tons, contracts for some of which will be let in the next few weeks. Small buildings consuming from 25 to 50 tons of steel are also plentiful, and the outlook for spring and summer trade is of the most encouraging kind. Prices are without change, and we quote carload lots, mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76c; angles 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 1.90c rates, 18, 20 and 24-inch, 10c extra; tees, 1.95c rates.

Plates.—Orders from the general trade have been in fair volume during the week. Store trade is reported active. We quote prices on carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼ inch and heavier, 1.76½c; flangs steel, 1.86½c. From store on small lots we quote: Tank steel, ¼ inch and heavier, 1.90c to 2c; 3-16, 2c to 2.10; No. 8, 2.10c to 2.20c; No. 10.

2.15c to 2.25c; flange steel, 2.25c, all f. o. b. warehouse.

Sheets.—A fair demand has been in evidence during the week, though it is not of such proportions as to grow enthusiastic over. We quote prices on carload lots, mill shipments, Chicago delivery, as follows: No. 27 black, 2.36½c to 2.41½c; No. 28, 2.46½c to 2.51½c. Galvanized sheets are moving freely, and we quote 80 and 2½ percent off. On small lots from store we quote as follows Nos. 8 and 10, 2.15c to 2.20c; No. 12, 2.20c to 2.25c; No. 13, 2.30c to 2.35c; No. 16, 2.40c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.65c to 2.70c; No. 27, 2.75c to 2.80c; No. 28, 2.80c to 2.85c; No. 29, 2.95c to 3c; No. 30, 3.10c to 3.15c. Galvanized, 75 and 7½ percent.

Rails and Track Supplies.—The Minneapolis, St. Paul & Sault Ste. Marie railroad has placed an order with the Lackawanna Steel Co. for 10,000 tons of standard sections, deliveries to be made before next June. From electrical and interurban roads in the West and Southwest, orders have been placed with Western mills during the past week for a total of from 10,000 to 15,000 tons. There is inquiry for rails from all parts of the country, ranging from 40,000 tons, in one instance, down to lots of 1,000 tons. Not all of these are expected to develop into orders, many of the inquiries coming from speculators with schemes for building railroads that rarely get beyond the initial stages. Specifications for standard sections are in fair volume; light rails and track supplies are also in good demand, and of these the mills are selling all they can make. There are no changes in quotations and we quote standard sections, 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; 25-pound rails, $25 to $27, according to point of delivery; 12-pound rails, $26 to $28, with regular differentials for intermediate sizes. Angle bars, 1.50c to 1.60c; spikes, first quality, 1.75c to 1.85c (out of store, 1.90c rates); second quality, 1.45c to 1.55c; track bolts, 3½ x ¾, with square nuts, 2.40c to 2.50c per 100 pounds; with hexagon nuts, 2.55c to 2.65c, with usual differentials for other sizes.

Merchant Steel.—The growing firmness of prices has brought a number of dilatory buyers in the market, and mills report a good tonnage closed in the past week. We quote mill shipments, carload lots, Chicago delivery: Spring steel, 2c; sleigh shoe, flat sizes, 1.60c; concave and convex, 1.75c; cutter shoe, 2.25c to 2.30c; smooth finished machinery steel, 1.71½c base, plow steel, 2.50c and upwards, according to quality; toe calk, 2.01½c to 2.11½c. Ordinary grades of tool steel, 6c to 8c; specials, 12c and upwards. Cold rolled shafting in carload lots, 52, and in less than carload lots, 47 percent discount from list.

Merchant Pipe.—There has been a good business the past week, both the jobbing and consuming trade specifying freely. Prices on merchant pipe have been advanced one point by the leading interest.

Boiler Tubes.—Orders have picked up and the volume of trade is reported as being better. We quote carload lots, mill shipments, Chicago delivery, as follows:

	L. W. Steel. Percent.	C. C. Iron Percent.	Seamless Steel. Percent.
1 to 1½ inch	42.35	39.85	53.35
1¾ to 2¼ inch	54.35	37.35	40.35
2½ inch	57.35	45.35	....
2¾ to 5 inch	63.35	49.85	Up to 4 inches.
6 to 13 inch	54.85	37.35	48.35

For car lots or less, direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron Percent.	Seamless Steel. Percent.
1 to 1½ inch	40	35	37.50
1¾ to 2¼ inch	50	32.50	35
2¾ to 5 inch	60	45	Up to 4 inches.
6 to 13 inch	50	32.50	45

Cast Iron Pipe.—Municipal contracts have not been conspicuous by their tonnage in the past seven days, though the orders for small lots are fairly numerous. We quote carload lots, Chicago delivery: 4-inch water pipe, $27; 6-inch to 12-inch, $26; larger sizes, $25; gas pipe, $1 a ton higher.

Wire Products.—There is still a fair volume of buying, and all classes of material are sharing in the movement. The entire output is being called for and producers are unable to keep pace with the demand. We quote prices to jobbers, Chicago delivery, as follows:

Wire nails, carload lots, $2.05; less than carload lots, $2.10; cut nails, carload lots, $1.86½c; less than this amount, $1.91½; plain wire, $1.95 carloads, and $2 for less than carload lots; galvanized plain wire, $2.25 in carload lots, and $2.30 in lesser amounts; painted barb wire, $2.35 carload, and $2.40 less than carload lots; galvanized barb wire, $2.65 carloads, and $2.70 less than carload lots. Staples, polished, carloads, $2.20; less than carload lots, $2.25; galvanized, $2.50 carloads, and $2.55 less than carloads. Bale ties 82½ and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb with actual freight allowed not exceeding 50 cents per 100 pounds.

Foundry Coke.—There is only a moderate demand for foundry coke while the furnace trade has scarcely any life. Prices are weak, and we quote 72-hour Connellsville foundry coke, $2 to $2.25 at the ovens, or $4.65 to $4.90 Chicago. Southern cokes range a little lower in price.

Old Material.—Increasing firmness summarizes the condition of the scrap market. This feeling cannot be said to be the outcome of any active demand for old material, nor has it been caused by the recent advances in bar iron since such mills as are running are reported to be well covered on scrap, but it is attributed largely to the efforts of several large dealers to buy up all the material that is being offered. These concerns are heavily obligated and are seeking to cover for their requirements while prices are low. With two large local buyers out of the market owing to the shut down of their plants and foundries generally transacting only a moderate business, there is little call for scrap of any kind; yet country merchants and small city dealers report there is no trouble in getting good prices from the big jobbers. Many of the former are taking advantage of this opportunity to unload the stocks they have been accumulating for several months past, and while actual trading between sellers and consumers is not of large proportions the trading between dealers has been brisk and has resulted in higher prices on several products. We quote dealers' selling prices gross tons, as follows:

Old iron rails	$15 00 to 16 00
Old steel rails (mixed lengths)	10 00 to 11 00
Old steel rails (long lengths)	12 50 to 13 00
Relaying rails	23 00 to 24 00
Old wheels	13 00 to 14 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 50 to 8 00

The following are selling prices for net tons:

No. 1 R. R. Wrought	$11 50 to 12 00
No. 2 R. R. Wrought	10 00 to 11 00
Shafting	12 50 to 13 00
Dealers' forge No. 1	9 50 to 10 00
No. 1 busheling and wrought pipe	8 50 to 9 00
No. 1 cast	11 00 to 11 50
Heavy cast (300 pounds and over)	8 50 to 9 00
Agricultural malleable	8 25 to 9 00
Iron axles	15 00 to 16 00
Steel axles	12 00 to 12 50
No. 1 boilers, cut	8 00 to 8 50
Cast borings	3 50 to 4 00
Mixed borings, etc.	3 50 to 4 00
Wrought turnings	7 25 to 7 75
Machine shop turnings	7 25 to 7 75
Iron axle turnings	8 00 to 8 50
Steel axle turnings	7 75 to 8 50
Stove plate and light cast scrap	9 00 to 9 50
Old iron splice bars	11 50 to 12 00

BIRMINGHAM, ALA.

Feb 2.

Pig Iron.—Though the demand is quiet, prices are holding firm, rumors to the contrary notwithstanding. Inquiry among the iron men in the Birmingham district fails to locate iron being sold below $10 per ton for No. 2 foundry, and the Sloss-Sheffield Steel & Iron Co. reiterates its statement that there is no anxiety on its part to sell No. 2 foundry, in quantity for delivery before March 31. Orders now being received in this district are in small lots, admittedly, but there are indications that consumers are not so well supplied for any long period ahead. Alabama furnacemen are hopeful that prices will improve during the second quarter of the year. Shipments during the past week were light as compared with the other weeks of the month, the difference being caused by the inclement and cold weather, snow being experienced for the

first time in the year. All iron is loaded by negroes and they cannot work in cold weather, their labor being on the outside.

Production in Alabama is holding up well. The new furnace of the Alabama Steel & Wire Co., at Gadsden, is doing good work, and the owners are looking for a 300-ton output. The Republic Iron & Steel Co. has a furnace almost ready for the torch. The Sheffield Coal & Iron Co., with three furnaces in the Sheffield, Ala., section, has let contracts for the hasty repairing of its furnaces. The Sloss-Sheffield Steel & Iron Co. has six of its seven furnaces in operation. The following are sellers' quotations:

No. 1 foundry	$10 50
No. 2 foundry	10 00
No. 3 foundry	9 50
Gray forge	8 75
No. 1 soft	10 50
No. 2 soft	10 00

The sales books of the two larger iron manufacturing companies in the Southern territory will be examined this week by the committees of the coal miners for the purpose of ascertaining the average price so that the mining wage can be determined for the month in accordance with the contract existing between the coal operators and the United Mine Workers of America.

Finished Iron and Steel.—Finished material shows a little improvement in the past week. The steel plant of the Tennessee Coal, Iron & Railroad Co. at Ensley, after two months' idleness, is again in operation, though not in full force. Steel rails are being made for the Louisville & Nashville railroad. The new mixing arrangement will be tried. The work of changing one of the tilting furnaces to a stationary furnace may be followed by a change of the other nine.

The situation as to rolling mills in this section remains unchanged. The Bessemer rolling mills, belonging to the Tennessee Coal, Iron & Railroad Co., and the Gate City mills, belonging to the Republic Iron & Steel Co., are in steady operation. The demand for finished iron and steel does not improve as rapidly as might be expected. Announcements concerning the big Birmingham rolling mills, property of the Republic company, are being anxiously awaited. There is no change at the steel rod, wire and nail mills at Ensley, the property of the Alabama Steel & Wire Co., the plant being as quiet as for several months. There will be no resumption of work at this plant until the company is making its own steel at Gadsden.

Foundries and machine shops in the Birmingham district appear to be busy with a number of jobs on hand, mostly from furnace companies. Cast iron pipe manufacturers have good reports to make and are consuming large quantities of iron.

Official announcement is made that the Republic Iron & Steel Co. will blow in its No. 3 furnace at Thomas, Ala., about Feb. 10. The furnace is 18 by 85 feet and has been relined in 50 days. Its daily capacity will be about 300 tons. Furnace No. 1, which is being practially rebuilt, will be blown in the last of this month. Its capacity will be between 240 and 275 tons daily. Furnace No. 2 is now making between 240 and 260 days daily.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., Feb. 2.

Tin.—The feature of the week was the publication of the monthly statistics—compiled by Secretary Meyer of the Metal Exchange—which exerted a bad influence on prices, resulting in substantial declines. While the restricted demand of late hung like a cloud over the market, it was not believed that the statistical situation was so bad. This shows that the total world's visible is now 17,115 tons, against 14,274 tons at the beginning of the year. Deliveries were 2,300 tons, a decrease of 1,000 tons as compared with January last year. Arrivals for the month amounted to 2,001 tons. The London market for the week was dull, and prices declined. Today's closings at the Metal Exchange follow: Spot to Feb. 27.60 to 28c. London's closings today follow: Spot, £125 17s 16d; futures, £126 2s 6d.

Copper.—The "official" prices for all grades were again reduced ⅛c during the week, but business is at such an exceedingly low ebb, that the announcement only received passing mention. Prices in the open market are a shade easier. The only important feature of the monthly statistics was the exports, which were the heaviest on record, amounting to 28,808 tons, against 10,478 tons for the same period last year. Germany took 23,000 tons of the shipments. The export business is alone active, and February is expected to make a good contribution to it. The London market during the week was active, with frequent changes, mostly in the direction of higher prices. Today's closings at the Metal Exchange follow: Lake, 12½c to 12¾c; electrolytic, 12⅜ to 12⅝c; casting, 12¼ to 12½c. London's closings today follow: Spot, £56 12s 6d; futures, £56 5s.

Lead.—The leading interest reduced prices slightly during the week, and spot is now lower at 4.45 to 4.60c. St. Louis is 4.37½c, and London, £11 5s.

Spelter.—Is quiet and easier, with spot at 4.90 to 5.00c. St. Louis is 4.67½c, and London, £21 17s 6d.

Antimony.—War news has brought about a good advance in prices, and Cookson's is now quoted at 7½ to 8c; Hallet's at 7c, and other brands at 6c to 6½c.

Quicksilver.—We quote $46 per flask of 76½ pounds in lots of 100 flasks. London is £8 5s.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK Feb 2.

The market is not quite so bullish as it was a week ago, although pig lead maintains a strong lead over other mentals both in demand and in the firmness of prices. This material is now quoted 4.50c in carload lots, and 4.55c to 4.65c in lesser quantities. Copper is weaker and in less demand, Lake being quoted 13c to 13¼c for carload lots, and 13½c to 13¾c for lesser lots; casting, carloads, 12¾c to 13c carloads, and 13¼c to 13½c for lesser lesser amounts. Pig tin, carloads, 30c; lesser lots, 30½c. Spelter, 5c carloads, and 5¾c to 6c for less than carload lots. Sheets zinc, 5.65c per pound for 600-pound casks, with 20c advance for less than carlots. Antimony, 7½c for Cookson's, and 6½c to 6¾c for Hallett's in small quantities. Nickel is 45c to 60c according to amount and deliveries.

Old metals are steady at the following prices:

We quote copper wire and heavy, $11 to $11.50; light copper, $10 to $10.50; red brass, $10.50; red brass borings, $9.50; yellow brass, heavy, $8.50; yellow brass borings, $6.50; light brass, $6; heavy lead, $4.25; tea lead, $3.85; zinc, 3⅝c; block tin pipe, 24c; pewter, No. 1, 19c.

No Strike at South Chicago.

(Special Telegram.)

CHICAGO, Feb. 3.—Referring to recent newspaper reports, it may be said that there is no strike on in any department of the works of the Illinois Steel Co. at South Chicago, and both the rail and plate mills are running full. The cut in wages which went into effect when the plant was started up, in line with the policy of retrenchment ordered by the United States Steel Corporation at all plants of constituent companies, has been accepted by the men and no strikes have been called nor are any expected. A few men in various departments have quit. The company has lived up to all agreements made with its employes.

Pennsylvania Tunnel Contract Deferred.

The Pennsylvania railroad has notified bidders on any portion of the New York tunnel work that it will defer the placing of contracts. The expectation was that awards would be made on Feb. 15. A considerable number of Eastern and Central Western foundries made bids on the big contract for castings for the tunnel, which amounted to 200,000 tons, the stipulation being that no scrap should be used in their manufacture. It is not known whether further bids will be asked, in the expectation of securing lower prices, or whether the company will undertake to do much of the work in its own foundries.

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ECONOMIES IN BLAST FURNACE OPERATION.

Times of depression in the iron trade, while greatly reducing the profits of the stronger concerns that have low costs of production, and forcing many of the weaker ones with high costs out of the market or out of existence, are always fruitful in the establishment of new economies in manufacture. The depression of the past six months, with the slight wage reductions thus far made, has already resulted in low record labor costs as well as low record consumption at some modern blast furnace plants, and with the adoption of still further economies that are under consideration the cost of producing pig iron at favored plants, so far as relates to furnace operations, will establish a long lead for American practice over that in any other country. That iron is being produced daily at one of the largest and most modern of the blast furnace plants of the United States Steel Corporation at a labor cost not to exceed 50 cents a ton may be doubted; but it is nevertheless the case, and as low as 47 cents a ton has been done at times when the output has exceeded the normal. Such economies in labor cannot be practiced where the latest appliances are not installed, but such a record shows what can be done by the adoption of economizing equipment to the fullest extent and points to the possibilities of further appliances in a country in which high wages are a constant spur to labor-saving inventions.

The competitive system by which the blast furnace plants of the United States Steel Corporation are operated had much to do with the establishment of this low labor cost, and the fuel consumption per ton of pig iron produced is also being greatly reduced as a result of this practice. Monthly gradations of all the furnace plants are made and the superintendent showing the lowest labor cost, lowest fuel consumption, greatest mechanical ingenuity, lowest repair cost, and greatest output for the class in which his furnace is rated, bears off the palm; and as the best showing will insure further advancement, every operator is constantly striving to effect economies, which if they do not place him at the head of his class, will at least put him well to the front. Naturally the pressure to discover new savings is increased when profits are lean.

Conditions of course are more favorable for reducing labor costs where a number of stacks constitute a plant than at isolated furnaces. Practically the same number of superintendents and foremen are required at isolated stacks as at group plants where the number of laborers per stack is less. While the United States Steel Corporation has a number of furnace plants consisting of only one furnace, the majority of its stacks are in groups, while in the case of the independent producers this statement may be reversed. Only a small proportion of the independent blast furnaces, moreover, are equipped with such complete and modern labor-saving appliances as prevail at the steel corporation furnaces. Despite the reductions in wages which became effective the first of the year, and other economies practiced, the labor costs at many of these plants range from $1.10 to $1.40 per ton of iron produced. Even at the more modern plants of the largest independent steel producers the labor costs are close to a dollar.

During the past three years, under high prices and the demand for record-breaking tonnages the fuel consumption has often exceeded the ton-per-ton ratio. With slower operations this consumption has been reduced as low as 1,800 pounds to the ton of iron for the daily average; and while this is not the record for low fuel consumption it is unusual for daily practice. In addition, the slower operation of the furnaces has given the operator better control of the output, fewer casts being lost, thus effecting a great saving. Economies have also been secured in the amount of fluxing material required, while the wear and tear on machinery is not nearly as great as when the furnaces have been forced up to their limits and oftentimes beyond.

Already one large steel concern is considering the advisability of increasing its blast furnace capacity so that in periods of great demand it can meet the requirements of its steel plant from a moderate output of an increased number of furnaces, rather than by record-breaking tonnages from its present capacity. The cost of additional furnace capacity will be great, but the economies accruing from lower fuel consumption, from iron conforming to the required analysis, from less fluxing material and less wear and tear on machinery, it is believed will more than balance the initial cost and the interest on the investment.

FOREIGN TRADE IN IRON AND STEEL IN 1903.

The statistics of foreign trade in iron and steel in 1902 indicated that exports had fallen off about 300,000 tons as compared with 1901, while in the same period imports had increased nearly 1,000,000 tons. The report of the Department of Commerce for 1903 shows that the imports have declined, so that the total for the year is 32,521 tons less than for 1902, for the iron and steel products included in our table. Exports show a decrease of 45,766 tons. The change which has recently set in is more clearly shown by comparing December, 1902, with December, 1903. In the former month the imports were 176,291 tons and the exports 22,023 tons, while in the latter month the imports were only 30,951 tons and the exports 42,259 tons. Imports

of pig iron have decreased from 118,373 tons in the former month to 14,719 for December, 1903. Imports of crude steel have decreased from 26,230 tons to 1,425 tons. The only increases of imports are in bar iron and wire and wire articles. The monthly import movement in pig iron and crude steel is shown below:

IMPORTS OF PIG IRON AND CRUDE STEEL, GROSS TONS

	1902		1903	
	Pig Iron.	Steel.	Pig Iron.	Steel.
January	7,833	5,312	110,679	38,691
February	8,307	2,335	45,187	20,151
March	17,184	6,570	59,628	31,461
April	19,067	13,005	99,944	29,014
May	30,708	24,388	57,139	26,389
June	32,458	35,588	79,874	30,530
July	62,156	36,124	38,046	33,070
August	79,447	39,027	40,475	20,380
September	82,196	27,726	16,414	13,530
October	67,204	32,036	18,704	10,343
November	100,400	41,077	18,765	6,580
December	118,373	26,230	14,719	1,425
Total	625,383	289,318	599,574	261,558

The total value of imports of iron and steel, excluding ore, but including a number of lines in which the tonnage is not ascertainable, was $1,739,486 for December against $2,309,233 for November and $4,701,865 in December a year ago. The total value for the year is $41,253,333 against $41,468,826 for 1902 and $20,395,015 for 1901. The tonnage table of imports follows:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	December		12 mos. end'g Dec.	
	1902.	1903.	1902.	1903.
Pig iron	118,373	14,719	625,383	599,574
Scrap	12,149	2,545	169,510	84,941
Bar iron	2,846	3,985	28,354	43,225
Iron and steel rails	6,027	2,067	63,522	95,555
Hoop, band or scroll	130	6	3,361	1,525
Steel ingots, slabs, billets or bars	26,230	1,425	289,318	261,558
Sheets and plates	1,072	479	7,156	11,691
Tin and terne plates	6,441	2,499	60,115	47,360
Wire rods	2,775	1,824	21,352	20,836
Wire and wire articles	298	479	3,468	5,018
Structural shapes*		923		8,865
Total	176,291	30,951	1,210,569	1,178,048

*Not reported separately prior to July 1, 1903.

The value of exports, excluding ore, but including machinery and other items of which the tonnage is not returned, was $9,353,950 for December, 1903, against $7,756,012 for December, 1902. For the year, the values were: $99,036,697 in 1903 and $97,892,036 in 1902. The detailed exports of which the tonnage is reported are as follows:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	December		12 mos. end'g Dec	
	1902.	1903.	1902.	1903.
Pig iron	1,210	5,070	27,487	20,381
Scrap	371	2,745	9,411	8,014
Bar iron	3,063	360	22,262	19,380
Wire rods	3,412	1,103	24,613	22,449
Steel bars (not wire rods)	592	2,722	9,300	17,802
Iron rails	1	38	211	181
Steel rails	601	7,572	67,458	30,656
Billets, ingots and blooms	.....	4,065	2,470	5,445
Hoop, band and scroll iron	128	200	1,678	2,140
Iron sheets and plates	177	140	3,134	4,782
Steel sheets and plates	881	1,499	14,870	13,242
Tin plates, terne plates and taggers' tin	35	88	1,565	292
Structural material	2,083	3,015	53,859	30,641
Wire	6,259	9,959	97,843	108,520
Cut nails	433	695	7,198	8,890
Wire nails	2,439	2,777	26,580	31,497
Other nails, including tacks	348	259	2,244	2,321
Total	22,023	42,259	372,419	326,653

Comparing the two Decembers, the most notable increases in exports were in pig iron, scrap, steel bars, billets, ingots and blooms, steel sheets and plates and wire. Exports of bar iron and wire rods show a decided decrease. The statistics of tin plate exports are not important, as the rebate business is not included.

The imports of iron ore were 1,165,470 tons valued at $2,583,077 in 1902 and 980,440 tons valued at $2,261,008 in 1903.

A Two-Dollar Advance in Sheets.

(Special Telegram.)

PITTSBURG, Pa., Feb. 3.—At the meeting of independent sheet steel manufacturers held at the Hotel Lincoln, this city, Friday, Jan. 29, at the call of the Independent Sheet Steel Manufacturers' Association, minimum prices for black and galvanized sheets were established. They agreed to hold black sheets No. 28 gauge at 2.30c at mill and No. 27 at 2.20c, with the usual differentials now prevailing on the other sizes. On galvanized sheets 3.30c was fixed as the minimum for No. 28 gauge and 3.10c for No. 27. For the past two weeks some of the independent sheet mills have been taking black sheet orders as low as 2.20c at mill for No. 28 gauge. This was not quoted by all the mills, but if this should be taken as the minimum of the market at that time the advance decided upon amounts to $2 a ton. The American Sheet Tin Plate Co. has not been quoting below the minimum established at last Friday's meeting, as at this price the mills can no more than realize cost on their product. With one exception, all the independent sheet mills were represented at this meeting, and this mill has never been a disturbing factor so far as price is concerned, and will quote the prices decided upon. Other mills not members of the Independent Sheet Steel Manufacturers' Association were present and will no doubt become members of that organization.

John D. Rockefeller Resigns.

The following addressed to Chairman E. H. Gary was given out at the offices of the United States Steel Corporation in New York, Feb. 1:

"No. 26 Broadway, New York,
"Jan. 14, 1904.

"My Dear Sir: I hereby tender my resignation as a member of the board of directors of the United States Steel Corporation. It has not been convenient for me to attend the meetings of the board. My interest in the company is represented on the board by my son and I hope the vacancy occasioned by my resignation can be filled to the advantage of the company by some one who can personally attend the meetings.

"JOHN D. ROCKEFELLER."

The following statement was made on behalf of the United States Steel Corporation: "Much as every one interested regrets the resignation of Mr. Rockefeller we must acknowledge the force of the reason he assigns for his action and must respect his wishes. Probably acceptance will be made at the regular meeting of the board on Tuesday, the 2d inst. Many of the directors expressed a desire to have Henry Phipps selected to fill the vacancy to be created and it is expected he will be unanimously elected and that he will accept."

At a meeting of the directors of the corporation held Feb. 2, Henry Phipps was elected to succeed Mr. Rockefeller. The letter of the latter is given no more significance in well-informed circles than it has on its face.

Obituary.

After an illness of three months with nervous prostration, Henry A. Cavnah, president of the Canton Foundry & Machine Co., and of the Bucher & Gibbs Plow Co., Canton, O., died Jan. 26. About a year ago Mr. Cavnah was placed at the head of the Structural Steel Car Co., of Canton, and the failure of this enterprise was a severe blow to him. He was a veteran of the civil war and was one of the most prominent citizens of Canton. He was in his 61st year.

William Avery Sweet, 73 years old, and at one time a leading manufacturer in Syracuse, N. Y., died Jan. 30. He organized Sweet Bros. & Co., Ceresian Cutter Works, Whitman & Barnes Co., Sweet Manufacturing Co., Sweet, Barnes & Co.; W. A. Sweet & Co. and Sweet Manufacturing Co. and was also one of the organizers and for 10 years a director of the Solvay Process Co.

The main building of the car shops of the Wheeling & Lake Erie R. R., at Canton, O., was totally destroyed by fire Feb. 2. Loss estimated at $100,000.

Philadelphia Machinery Market.

Feb. 2.

The volume of business in the machinery trade for the month just passed was slightly larger than for the preceding month. While January was not notable for the number of shipments made on orders in hand, the influx of ne wbusiness was larger than for two or three months. Many of the orders booked covered estimates made months ago, and builders are in consequence hopeful that the lull which has been so conspicuous for some time is near its end. The tone of the market is stronger in every way, and the number of inquiries coming in is quite cheering. The estimating departments of several of the larger concerns are quite busy, and many of the propositions for estimates are large in character. Special machinery and tools seem to be rather more in demand than standard lines, and early deliveries are called for.

Prices remain pretty firm, and prospective buyers do not appear to be looking for much in the way of concessions. While more bookings are desired on every hand, there is very little disposition to secure them on price.

Working forces have in many plants been considerably reduced, but further reductions are not expected.

Several invitations for bids on public work are out, although none cover anything of magnitude. The Bureau of Filtration of the Department of public works, Philadelphia, Peter E. Costello, director, will receive bids up to noon of February 18, for electrical generators, driving engines, main switchboard, pumping engines and boilers for the Lardners' Point pumping service, pumping station N. 2.

An order is issued from the Quartermaster's Office, Chattanooga, Tenn., for bids, to be in by noon of Feb. 24, for the construction of a pumping plant, including pump and boiler house, pumping machinery and connections to wells and reservoir at the new military post at Chickamauga Park, Ga.

The Ordinance Office, War Department, Washington, D. C., is calling for bids for 40, more or less, 4½-inch shields for 6-inch barbette carriages, 1900 model. Builders may bid for lots of 10 or all of the shields.

The entire plant of the Eddystone Foundry & Machine Co., Eddystone, Pa., is to be offered for sale Feb. 4. The plant includes foundry, machine and pattern shops, power house, tools, fixtures and stock.

The business, patents, stock, and plant of the Electric Vehicle Equipment Co., in Philadelphia, were offered at a receiver's sale in bankruptcy on Saturday, Jan. 30. There being no satisfactory bids for the whole, the property was sold out piecemeal.

L. Schulte & Co., enginerrs and machinists, Twelfth and Thompson streets, have purchased a site adjoining their plant on which they will build an extension to their works. Some additional equipment will be required.

J. H. Johnson Jr. Co., builder of lathes, booked some good orders during January, including two for 48-inch and 36-inch special lathes. Among their shipments for the month were a 54-inch x 27-foot lathe to the Miehle Printing Press Co., Chicago, a 36-inch x 20-foot motor driven lathe to the Lorain Steel Co., Dannora, Pa.; and a 36-inch x 35-foot lathe to Steel & Condit, Jersey City, N. J.

The Link Belt Engineering Co. reports a fair business for January. Among its orders was one from the Western Maryland & Tidewater R. R. Co., Baltimore, Md., for 40 adjustable chutes for bituminous coal, for use at the coaling wharf. These chutes are so arranged that the drop of the coal is adjustable to the rise and fall of the tide. Among the work approaching completion in the shops is a large power house plant for the Manhattan Railroad Co.

The Philadelphia Pneumatic Tool Co. says that January was a good month so far as orders are concerned, and is fairly well satisfied with the outlook for future business. The company reports a large inquiry coming in, including many foreign specifications, one or two of considerable magnitude. J. W. Tierney, the president, and T. L. Tierney, assistant to the president, are resigning their offices in the company, the resignations taking effect Feb. 15. Julius Keller, at present superintendent and engineer, and patentee of the company's patents, will be the new president.

The Falkenau-Sinclair Machine Co., builder of special machinery, presses, and testing machines, found January business better than for some months previous. A number of good orders were booked, and inquiry was very satisfactory. Its shipments covered mainly standard presses of ordinary size. One large shipment, however, was the chain testing machine it has for some time been engaged on for the Boston Navy Yard. This machine is of 800,000 pounds capacity, and is thought to be the largest ever built.

The American Pulley Co. reports a good business for January and says that in volume it very nearly approached the business of the January previous. The firm made a great many shipments and booked a number of good orders. Quite a large foreign business is under way, orders coming from Great Britain, France, Italy, Switzerland, Denmark, Mexico, South Africa, and Australia. The foreign business for 1903 was more than two and one-half times greater than for any previous year.

The Hess Machine Works, builder of file making machinery, made some shipments of machines to France and England, and have in hand some good orders, also for foreign points. They are also building some special machinery for domestic concerns.

PERSONAL.

W. L. Cheney, until recently in charge of the Philadelphia agency of Walter H. Foster, entered the service of the Lucas Machine Tool Co., of Cleveland, on Feb. 1.

J. B. Clark, formerly superintendent of the Bessemer department of the Consolidated Lake Superior Co., at Sault Ste. Marie, Ont., is now night superintendent of the Bessemer department of the Lackawanna Steel Co., Buffalo.

E. E. Erikson, general manager of the Norwalk Steel & Iron Co., Norwalk, O., who had been in a Cleveland hospital seriously ill, returned home last week much improved.

Valentin Faul, of C. Faul & Fils, Paris, large handlers of American agricultural machinery, has returned to Paris after a short visit in the United States.

Francis Fenwick, of Fenwick Freres & Co., Paris, handlers of American machinery, has sailed for home after several weeks spent in this country. He placed orders with the Brown & Sharpe Mfg. Co., of Providence, R. I., and with the Pratt & Whitney branch of the Niles-Bement-Pond Co.

E. D. Rogers, vice president and general manager of sales of the Bassett-Presley Co., Cleveland, has resigned. E. C. Kollfrath, who was Mr. Rogers' assistant, has been made general manager of sales. The position of vice president has not yet been filled.

A. N. Spencer will associate himself with the American Steel Foundries, commencing Feb. 1, as sales agent, having charge of the district sales office in the Pittsburg district.

Capt. George W. Gageby, master mechanic of the Shenango plant of the Carnegie Steel Co., New Castle, Pa., has resigned and has been succeeded by George A. Rigby.

Orran W. Kennedy, who recently retired as general superintendent of the Connellsville region plants of the H. C. Frick Coke Co., was tendered a testimonial banquet by the employes and officials of that company at Scottdale, Pa., on Saturday evening, Jan. 30.

William Banfield, who resigned as district manager of the American Tinplate Co. about a year ago, has accepted the position of manager of the new sheet and tinplate plant of the Follansbee Bros. Co., of Pittsburg, which is nearing completion at a small station in West Virginia on the Ohio river, opposite Mingo Junction, O. Before the formation of the American Tin Plate Co. he was a member of the firm of Wallace, Banfield & Co., who operated a small four-mill plant at Irondale, O.

W. J. W. Moore, for many years with Pilling & Crane, iron, steel, and coke merchants, of Philadelphia, has severed his relations with that firm and connected himself as salesman with Rogers, Brown & Co.'s Philadelphia office.

General Manager Coulby, of the Pittsburg Steamship Co., has appointed F. B. Smith chief engineer to fill the vacancy caused by the resignation of J. F. Hayes. Mr. Smith has been Mr. Hayes's assistant.

The Buffalo Loan, Trust & Safe Deposit Co., as receiver, of the United States Tube Co., has been ordered by court to sell the plant at public auction.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

Arthur A. Hamerschlag, director of the Carnegie Technical School of Pittsburg, addressed a large gathering of foundrymen and a delegation of molders at the monthly meeting of the Pittsburg Foundrymen's Association, held on Monday evening, Feb. 1. He told the foundrymen of the Pittsburg district, what they have been trying to learn for the past three years, ever since Andrew Carnegie made the donation for the founding of a technical school, namely, what the school would do for the foundry industry not only of the Pittsburg district but of the entire country.

The scope of the school, Mr. Hamerschlag stated, is yet to be decided upon, and he asked for the assistance of the foundrymen for suggestions along this line. The standing committee of the Pittsburg Foundrymen's Association and the American Foundrymen's Association as well, of which J. S. Seaman, of Pittsburg, is the chairman, will confer with the director in the near future and the initial steps will be taken for establishing a course in foundry practice in the curriculum of the new school. The director's knowledge of foundry practice astonished those present and from his remarks it was apparent that he has an excellent idea of what a course in foundry practice should embody and how the apprentice, journeyman and foundryman should be helped in their work to attain a still greater knowledge of their trade.

"Anything that the Carnegie Technical School will do for the foundrymen will be done with a view to benefiting those in their employ as well," he said. "Both are producers; the molder must be classed as such as well as the foundryman whose capital is invested, and we propose to provide educational work that will include the molder as well as his employer.

"Foundry practice has not been greatly touched upon in general education. The success the foundryman has attained is largely due to experiments and research he has made in his own foundry, and while the results that have been attained are great, the underlying principles of the industry, the theories of the practice must be mastered to make still further strides. A course in foundry practice should include chemistry, physics, thermics and practice—all are essential to the molder as well as the foundryman. This school, however, has no precedent no faculty, no outlined course of instruction. You must give us the recommendation that there exists a demand for such a course, provide an enrollment and assist us in outlining the course, and we shall look after the rest, the funds having been provided for. Your committee should confer with the molder and decide on what you would like to have taught, and when this has been determined we shall outline a course."

In answer to a number of questions the speaker stated that the school would not only be open to residents of Pittsburg and Allegheny county, but to outsiders as well. Inasmuch as the city of Pittsburg had donated the site for the school, the tuition fee for residents of that city will only be nominal, while a slightly increased fee will be required of those not residents of the city. In organizing this course it is the intention to give those who have had some experience in foundry work the preference, and if the classes are not filled beginners will be taken in. Instruction is to be given apprentices by high class journeymen molders, while the journeymen who are anxious to make still further progress will be given instruction by the managers and superintendents of plants. Those who want to receive still further knowledge along theoretical lines as well as practical will receive instruction accordingly. It is not the intention to graduate skilled mechanics, however. Mr. Hamerschlag wanted this point understood thoroughly, as it seems that the impression prevails that the school will be one that will give skilled mechanics to the employers. He stated that this has been tried too often with the result that it has always resulted in failure. The apprentice is to be helped along in his work in order that he may become a better journeyman than the molder who has not had the opportunity of such a technical training. The journeyman molder who aspires to perfect himself still further in his calling with a view to becoming a foreman, superintendent or foundry operator, will have such courses open to him, while the foundryman as well can avail himself of the opportunities the course will afford in becoming acquainted with the advances made in foundry practice.

Mr. Hamerschlag said that he wanted not only the cooperation of the foundrymen in outlining a course of study but their assistance in keeping that course up to date. For that reason the committee of foundrymen should be permanent in order that the course shall be flexible and that it may be changed from time to time as advances in practice are made. Too many of the schools that teach so called trades do so from text books, he said, which teach practices which are obsolete and have long been discarded. The result is that the young man receiving such training finds it absolutely worthless when attempting to apply it in his calling where more advanced practices are in use.

A paper on "Steel Castings" was read by L. L. Knox, of Pittsburg, and was discussed at some length, as several steel casting manufacturers present took issue with him on his statement that castings made from basic steel are as good as those made from acid and that it is difficult to tell the difference between them. The paper is printed elsewhere in this issue.

Five applications for membership were favorably acted upon. The new members are as follows: Brown & Zortman Machinery Co., Pittsburg, Pa.; Stuart B. Marshall, Pittsburg manager of L. & R. Wister Co., of Philadelphia; J. S. McKesson, Pittsburg manager of Corrigan, McKinney & Co., of Cleveland; N. P. Hyndman, general sales agent of the Washington Coal & Coke Co., Pittsburg, and the Harbison-Walker Refractories Co. The following members and visitors were in attendance:

Arthur Hamerschlag, Carnegie Technical Schools.
L. L. Knox.
Wm. H. McFadden, Mackintosh-Hemphill & Co.
R. F. Barker, Taylor, Wilson & Co.
John McLaren, Mr. Phillips, Mr. Phillips Jr., Phillips & McLaren.
A. W. Smith, Chas. G. Smith & Co.
A. E. Dodd.
G. Schade, Mr. Schade Jr., Braddock Machine & Mfg. Co.
Wm. Yagle, Yagle Foundry & Machine Co.
Daniel Ackerman.
A. W. Slocum, Keystone Car Wheel Co.
H. S. Ridenour, W. J. Carlin, Thos. Carlin Sons Co.
S. D. Sleeth, Westinghouse Air Brake Co.
Mr. Fields.
Prof. Connelly, Allegheny Schools.
E. F. Bell, Pressed Steel Car Co.
Wm. Davis, H. K. Porter & Co.
D. P. Thomas, Henry Spilker, Sterritt-Thomas Foundry Co.
J. S. Seaman, Seaman-Sleeth Co.
Joseph Dorsey, Enterprise Foundry Co.
Mr. Cheesbrough.
C. E. Hull.
Mr. Jones, W. H. Treadwell & Co.
Charles Townsend, Thos. Carlin Sons Co.
Mr. McDougall, Pittsburg Steel Foundry.
J. S. McCormick, Mr. Malone, J. S. McCormick Co.
John Birch, Pittsburg Malleable Iron Co.
L. E. Dunlap, Mackintosh-Hemphill & Co.
Fred Liepold, Frank-Kneeland Machine Co.
Paul Kreutzpointner, Altoona, Pa.
B. D. Fuller, Westinghouse Electric & Mfg. Co.
Mr. Galladet.
Stuart B. Marshall, L. & R. Wister & Co.
J. Goldstein.
G. Fleshman.
A. O. Backert, *The Iron Trade Review.*
Bryan Robertson, Field-Evans Iron Co.
James Lathwood.
S. H. Stupakoff.
E. A. Kebler.
Mr. Seaman.
Jno. Loder, Edgar G. Seaman, S. Obermayer Co.
R. A. Walker, *Iron Age.*
Mr. Hillman, J. H. Hillman & Son.
E. D. Frohman, S. Obermayer Co.
A. W. Slocum.
L. A. Frank, Duquesne Steel Foundry.
Valentine Barie, James Mallon, A. Johnson, J. A. Duval, F. Bryson, Michael Manning, James Barry and W. E. Tremellen, iron molders.
John L. Orrell, F. H. Zimmers, Union Foundry & Machine Co.

The Chicago, Milwaukee & St. Paul road, which hauls ore from the Menominee range to North Escanaba, is building 500 100,000-pound ore cars at its own shops. The road handled 760,000 tons of ore last year to its own docks, besides 85,000 to Gladstone.

The Labor Situation.

N. M. T. A. CONVENTION AT PHILADELPHIA.

The dates heretofore announced for the annual convention of the National Metal Trades Association at Philadelphia have been changed to Monday and Tuesday, March 21 and 22. The administrative council will be in session Saturday, March 19. Monday evening will be devoted to a dinner from which shop talk will be barred, the objects being better acquaintance and a good time.

A matter of special interest to be taken up by this convention is that of the local association and its relation to the national body. The officers of the latter want to adopt some plan by which the local associations may be merged with the N. M. T. A., and without detriment to the efficiency of the local organizations. A factor of some importance is the pro rata interest of each present member of the N. M. T. A. in its reserve fund, which at present amounts to $2.34 per full operative. Secretaries of local associations have been asked for suggestions and the matter will be thoroughly canvassed at Philadelphia.

Well known speakers have been arranged with to address the convention on shop methods and management, and reports of the officers and of district committees will be presented. F. A. Halsey, of New York, will discuss the metric system, appearing in opposition to the bill now before the House Committee on Coinage, Weights and Measures at Washington, providing for the use of the metric system in all departments of the Government, in the transaction of all business requiring the use of weights and measures, excepting in completing the survey of public lands, and making metric system weights and measures the legal weights and measures of the United States. H. L. Gantt will speak on the importance of detailed time study in shop management, particularly in reference to piece, premium, bonus and other similar systems. It is expected also that a paper will be read on the apprenticeship system of the Baldwin Locomotive Works at Philadelphia. The following questions have been proposed by members for discussion at the convention:

1. In the light of present developments, how should organized labor be dealt with?
2. Do the teachings and methods of organized labor tend to create good citizenship?
3. What must be the effect on the United States, if organized labor is permitted to run its course?
4. What can the National Metal Trades Association do towards the establishment of a national apprenticeship system?
5. What further can our association do towards educating the public on present industrial questions?
6. What more vital question is before the American public today than that of the "open shop?"
7. Is a universal standard of hours desirable, and if so, is it attainable in the machinery business?
8. Is there any reason to believe that national agreements with national unions are desirable?
9. What should be the proper function of employers' associations and how can the interest in such associations be maintained during times of labor inactivity?
10. Should not the members of the National Metal Trades Association do everything possible to establish piece work and premium work on a fair and equitable basis?
11. Should the metric system be introduced into American shop practice?
12. Have high speed tool steels increased production as much as could reasonably be expected?
13. Can employment bureaus be undertaken to advantage in small cities?

VIOLENCE AT MOLINE, ILL.

Owners of the eight largest implement plants and iron works in Moline, Ill., have been threatened with the destruction of themselves and their wives and children, if the demands of striking molders are not granted at once. A cowardly anonymous letter was received a few days ago by Harry Ainsworth, secretary of Williams, White & Co., which was in part as follows:

"We suppose that you'll think this an idle threat, but just as sure as there is a heaven above, if you and the other foundrymen don't make a settlement with the molders, we'll blow you and your families out of existence. Although we don't like to take innocent lives, yet we think it permissible in this case and will wreak vengeance on you and yours, guilty and innocent alike. We come to do this work and we now give you our word of honor that it will be done right. Your lives are marked. We don't care which of the eight we get first, but get you we will. For the Lord's sake, take this serious; for the love of your innocent wives and children take heed. For everything I have planned and in readiness, and, by everything that's high, we will carry this out. We will give you a reasonable length of time to make things satisfactory to the strikers."

The letter was signed "Dynamiter," and a postscript read: "If you care to answer this letter, address, M, 3456 61st St., Chicago." This letter is one incident in the bitter warfare the strikers have waged since they went out last spring for a nine-hour day. They have waylaid non-union workmen, attacked them in the street, and defied the laws of the city until the mayor has been compelled to swear in special police to dispel the mob. Employers were willing to grant increased wages, but not the shorter day and, as they have been working their foundries in some cases and sending work away in others, the strikers have become more bitter every week.

DULLNESS DUE TO STRIKES.

Wallace Downey, of the Townsend-Downey Shipbuilding Co., Shooters Island, N. Y., discussing the depression in shipbuilding in the metropolis and vicinity, said:

"The labor situation is largely responsible for the present dullness in trade, the trouble going further back than the last strike or series of strikes. It began three years ago, with the rapid rise of wages, the cutting down of the hours of labor and the great restriction of the amount of work performed per man. The last is to my mind the greatest factor in bringing about the present deplorable state of affairs, both for the employer and employe. It is safe to say that the volume of business has decreased about $3,000,000 in the past eighteen months, which must mean a much greater loss for workmen in this vicinity than it does for the employers."

Another large New York employer affected by the shipyard strikes said that other American ports had largely benefited from the work lost to New York. He estimated that forty transatlantic liners which used to get repair work done in New York are getting it done elsewhere. Regarding the building of ships of large tonnage in New York, he said:

"Until labor conditions are on a more stable footing any enterprise in the way of building ships of large tonnage in New York is not to be looked for. Labor conditions could be made such as to make it possible to build battleships here. By this I do not mean that the wages would be cut down to any great extent. I mean that if employers had any guarantee that there would be no labor upheavals for some time and that employes and employers could work in harmony, the business could be developed so that the largest ships could be built hereabouts. Enterprise in this direction, however, would be useless under the conditions which have ruled in the past."

PITTSBURG STRIKE SETTLED.

The Building Trades Council and the Builders' Exchange League, of Pittsburg, have at least effected an amicable agreement. The plumbers' strike is ended and the lockout of 10,000 workmen has been declared off. A contract has been entered into which insures harmony for at least a year. Each trade will work eight hours a day, and when disputes arise, they will be settled by arbitration. Each side must give three months' notice of a desire to change the scale. The plumbers' strike started Oct. 1 and shortly afterwards a sympathetic strike of painters and decorators, electricians, tile setters, housesmiths and tinners was ordered. The action tied up work on many buildings in course of construction. On Nov. 12 the builders caused a general lockout, throwing nearly 10,000 workers into idleness. Steps were taken to secure peace, and negotiations ended a few days ago, when the plumbers signed the uniform agreement. The plumbers struck for an increase from $4 to $4.50 a day, but returned

to work at the old wages. The loss to the builders and workmen has been enormous. It is estimated that the workers have lost over $500,000. The cost of the construction tied up by the strike is estimated at $11,825,000. The agreement reached with the various trades will, it is believed, inspire confidence in those contemplating the construction of buildings, and it is expected that there will soon be a large increase in building operations.

ALLIS-CHALMERS CO.'S CONTRACTS WITH UNIONS.

The Allis-Chalmers Co. has notified the union employes of its Chicago plant that the company may not desire to renew the present agreements, which expire May 1. A notification was sent to the business agent of each union by registered mail, and was a decided surprise to the recipients. In speaking of the matter, General Manager Gates said: "If present conditions continue in the business and financial world, I believe it will be necessary for employers of labor to reduce wages this year. The notices we have sent to the trades union organizations are merely formal and state that the company desires to make some changes when the agreements expire. What these will be the company has not decided. Whether it will refuse to enter into contracts with the unions for another year, has not been determined. Our agreement with the unions was so worded that the unions had to be notified on or before Feb. 1 or the contract would be perpetual." The unions chiefly interested in the Allis-Chalmers plants are those of machinists, blacksmiths and helpers, stationary engineers, stationary firemen, iron molders, electricians, sheet metal workers, boilermakers and steam fitters.

A GREAT MENACE TO LIBERTY.

The Rev. Thomas E. Sherman, S. J., a son of the late General W. T. Sherman, in a speech last week at the 15th annual banquet in Chicago of the Western Society of the Army of the Potomac, said:

"The threats of unionism in Chicago and elsewhere throughout the country are a greater menace to liberty and the foundations of the Government than the Southern Confederacy ever was. There is grave danger around us today. When my duty as a clergyman is interfered with in giving a decent Christian burial to the dead, then, may I ask, is there any government in the city of Chicago? When men have no respect for the dead surely they have none for the living. We must reorganize labor throughout the country or we will have another conflict greater than any the American people has had to contend with. New leaders should be chosen, men who will try to ameliorate rather than inflame the passions of those who compose the labor organizations. The Civil War resulted because our forefathers were afraid to legislate against slavery. Trouble will come again unless legislation is enacted."

AMALGAMATED ASSOCIATION IN THE EAST.

During the past few weeks the Amalgamated Association of Iron, Steel and Tin Workers has organized four new lodges in the East. The association has been weak in this part of the country until a year ago, when organizers were thrown into the field, with the result that about 30 lodges are now members of the association. Lodges have been organized at Berwick, Danville and Milton, Pa., and at Troy, N. Y. The constantly increasing strength of the association in the East indicates that at the coming convention in Cleveland a scale for the territory east of the Alleghenies will be adopted for presentation to the manufacturers.

WESTINGHOUSE OPEN-SHOP POLICY.

The Cleveland plant of the Westinghouse Electric & Mfg. Co. was closed Jan. 30 for a week or two in which to make repairs. When they are reopened, all employes will be required to sign a contract agreeing to work in an "open shop." The coremakers and molders are believed to be the only organized workers employed at the Westinghouse works. So the only part of the plant affected by the proposed change of policy is the foundry. Although of late the Cleveland plant has employed about 400 men, it has at times in the past given employment to 600. The old machine shop of the works is undergoing extensive alterations. In about two months it will be reopened and, with the additional facilities which this will afford, employment can be given to more than 1,000 men. According to plans now being made the force that may eventually be taken on might be larger by 600 men than any which has heretofore been engaged by the concern at one time in Cleveland.

N. M. T. A. NOTES.

Commissioner DuBrul addressed a meeting and assisted in the formation of a new association in Trenton, N. J., which will be known as the Manufacturers' and Employers' Association. Clifton Reeves, of the Reeves Engine Co., was elected temporary secretary.

The N. M. T. A. office is advised that A. Falkenau of the Falkenau-Sinclair Co. has been elected to the presidency of the Metal Manufacturers' Association of Philadelphia. This association is negotiating with D. H. McPherson, one of the district organizers of the N. M. T. A., to become its secretary.

E. F. DuBrul, commissioner, left for Washington on Monday, Feb. 1, to be present at the hearing of the Power Boat bill which comes up Feb. 4.

The association has arranged to help out one of its members who is in the throes of a labor difficulty. The work will be done by another member located at a distance of 60 miles from the scene of trouble.

Special rates have been secured from the railroads for members attending the March convention in Philadelphia. To insure these rates it will be necesary to ask the ticket agents for a certificate which will be endorsed by the secretary, Mr. Wuest.

Secretary Wuest spent a day at Youngstown last week with one of the members who is having some labor difficulty.

Letters are being received by the N. M. T. A. office from members and other concerns eligible to membership, at Toledo, O., with a view to forming a local association at that point.

The Citizens' Alliance at Joliet, Ill., which was formed by W. O. Bates, of the Bates Machine Tool Co., reports a large increase in membership, thanks largely to the assistance rendered by the N. M. T. A.

The labor bureau idea which was created and fostered by the N. M. T. A. is being taken up by a majority of the Citizens' Alliance which have been or are being formed all over the country.

The N. M. T. A. has made arrangements with the secretaries of local associations operating labor bureaus in conformity with the rules which were adopted by the N. M. T. A. at the Buffalo convention, to mail to the commissioner's office a weekly report of all unemployed operatives coming under the classification of the association.

Quite a delegation of Cincinnati manufacturers will go to Washington Feb. 24 to assist in the defeat of the anti-injunction bill.

N. F. A. OFFICERS AT MILWAUKEE.

An enthusiastic body of foundrymen greeted President Frank and Commissioner Briggs, of the National Founders' Association at the meeting held in Milwaukee last Monday afternoon. This city was the first stop in the tour just undertaken by these officers to the various local foundry organizations in the West for the purpose of acquainting themselves with actual conditions in the various foundry centers and also with a view to arousing increased interest in the work of the N. F. A.

The meeting was held in the rooms of the Builders' Exchange, at 456 Broadway, beginning at 2 o'clock and remaining in session until evening. There were about 40 foundrymen present, including a number from Racine, Beloit, Port Washington, and Portage Lake, Wis., and one from Houghton, Mich. A larger attendance was expected and undoubtedly would have been present had not the hour of the meeting been changed from the evening to the afternoon, which made it impossible for many to attend.

Walter Read, president of the Milwaukee Foundrymen's Association, presided at the meeting, Mr. Frank and Mr. Briggs being introduced by Irving H. Reynolds, formerly of Milwaukee and a member of the Administrative Council of the association. Mr. Frank spoke with reference to the work of

the N. F. A. He said that the meeting was called for the purpose of getting acquainted with the members and friends of the association in Milwaukee and vicinity; also that the object of the N. F. A. was to assist and improve conditions, not to crush the unions. This fact he emphasized in his remarks. He referred to the Iron Molders' Union as being one of the strongest organiaztions of its kind, and that it was essential for the best interests of the members of the N. F. A. and of the whole foundry industry, that they have an equally strong organization. He proved conclusively the necessity of a national organization, as well as the urgent need of a strong local body in each foundry center, large or small.

Mr. Briggs confined his remarks largely to the proposed uniform agreement between foundrymen and molders and strongly urged its adoption. He said that the intent of a national agreement was to secure a fair basis of co-operation between employers and employes, and that such an agreement would save much of the friction that resulted from a large number of local agreements with varying wage basis and widely different shop conditions.

After a recess had been taken, during which refreshments were served, the meeting was thrown open to discussion. Nearly all the foundrymen present took part, putting questions with great freedom to the commissioner and president of the association. The result was a clearer understanding of the needs and aims of the N. F. A., and the probable addition of several concerns to its membership, since a number of those present not members of the association expressed themselves as favorable to joining it.

Among those attending the meeting were the following:

T. W. Sheriffs, Sheriffs Mfg. Co.
O. W. Greenslade, Greenslade Foundry Co.
O. W. Turner, Western Malleable & Gray Iron Mfg. Co.
David McLain, National Electric Co.
R. W. Grace, Bucyrus Co.
A. Pawling, Pawling & Harnischfeger.
Theo. Vilter, Vilter Mfg. Co.
F. A. Wilde, Nordberg Mfg. Co.
C. E. Sammond, Stowell Mfg. & Foundry Co.
Alman Emrie and A. E. Harrison, Allis-Chalmers Co.
Clarence Falk, Falk Co.
Walter Read, Filer & Stowell Co.
Irving H. Reynolds, Wm. Tod Co., Youngstown, O.
A. J. Lindemann, A. J. Lindemann & Hoverson Co.
H. B. Goodrich, J. A. & P. E. Dutcher Co.
James Aston, Thomas Aston Sons Co.
E. H. Walker and Mr. Peebles, J. I. Case Threshing Machine Co., Racine.
Wm. Sobey and Mr. Wallis, Case Plow Works, Racine.
Mr. Ross, Beloit Iron Works, Beloit.
S. Griffiths and P. C. Brooks, Fairbanks Morse Mfg. Co., Beloit, Wis.
Mr. Carroll, Carroll Foundry Co., Houghton, Mich.
W. S. Cheaves, Portage Lake Foundry Co., Portage Lake, Wis.
John Gilson, Gilson Mfg. Co., Port Washington, Wis.

LABOR NOTES.

Because several carpenters employed at the Malleable Iron Co.'s new shops in South Wilmington, Del., were put to work imbedding glass in sashes, the painters at the same shops quit work. The painters were promptly paid off and their places filled.

Labor troubles have again caused the closing down of the plant of the American Steel Foundries at Granite City, Ill. The molders, helpers and core-makers were prepared to strike and the management decided to close the works and avoid expected troubles. A strike of the members of these unions closed the plant last August and it remained idle until a few weeks ago.

The Dawes & Myler foundry of the Standard Sanitary Mfg Co., of Brighton, Pa., has been put in operation after several weeks' idleness. A scale of wages has been arranged with the molders for the year 1904, the arrangement being a compromise.

The employes of the wire mill of the Carpenter Steel Works, Reading, Pa., have gone on a strike on account of a 10 percent reduction in wages.

About three years ago the employes of the Mt. Hope Iron Co., Somerset, Mass., received an increase in wages of from 10 percent to 15 percent. They have recently been put back to the old scale. The employers and employes are on friendly terms and no trouble is expected on account of the reduction in wages.

The Parkersburg Iron & Steel Co., whose employes have been out on a strike for some time, has reopened the plant as an open shop. So far, only peaceful means are being used by the former employes to prevent the new men from working.

Fifty non-union bridge workers in the employ of the Union Pacific Railway Co., at Kansas City, Kan., were attacked a few days ago by about 100 members of the Structural Iron Workers' Union, and a fierce battle ensued in which four men were seriously hurt. The Union Pacific laborers had just finished their day's work on the new bridge across the Kaw, in Kansas City, Kan., and were starting for home on the work train. In anticipation of trouble, Union Pacific men had been sworn in as special officers and carried weapons. When they opened fire, the attacking party scattered.

A complete settlement has been reached between the Case Threshing Machine Co., Racine, Wis., and its machinists, who were the last of the employes with whom a settlement was made after the recent strike. The scale of wages will be nearly the same as that paid last season.

T. H. Garrett Jr. has decided to close his foundry and machine shop at Rochester, N. Y., giving as a reason that the molders' union imposed such conditions that he did not care to continue the business.

The boilermakers employed by the Chicago, Lake Shore & Eastern railroad of the Illinois Steel Co., at South Chicago, are out on a strike against a reduction in wages.

Five hundred axle turners and workers have been laid off at the Pullman shops, Pullman, Ill. The plant is said to be running at half its capacity.

The Spang-Chalfant Co., Pittsburg, succeeded this week in placing in operation one of its pipe furnaces with non-union men. The employes of this plant went on a strike some time ago against a reduction in wages.

The National Malleable Castings Co., Sharon, Pa., has announced reductions ranging from 5 percent up in the wages of its laborers and molders. The molders and core workers refused to accept the reductions and went on a strike.

The employes of the Wheeling Steel & Iron Co., Wheeling, W. Va., have been notified that at the end of February, when their present scale expires, there will be a readjustment of wages on a lower basis. The men will no doubt accept the new scale.

Employes of the Cambria steel works, Johnstown, Pa., received notice Feb. 1 of a readjustment of wages to go into effect on the 15th of this month. The basis of each man's pay is established by an agreement between him and the head of the department in which he is employed. The readjustment affects every class of employes, and the general basis will be that prevailing before the last readjustment, July 1, 1902. Over 10,000 men are affected.

A general reduction of wages went into effect Feb. 1 at the Midvale Steel Works, Philadelphia, affecting 3,500 employes. The decrease is graded according to the wages received and ranges from 5 to 35 cents a day.

The Long Island railroad has placed an order with the Pressed Steel Car Co. for 200 freight cars. The Delaware, Lackawanna & Western is in the market for 1,500 flat cars, and the C., A. & C. division of the Pennsylvania railroad has ordered 97 freight cars from the Standard Steel Car Co.

Announcement is made that the firm of Henderson & Trago, dealers in pig iron and coke, Williamson building, was dissolved by mutual consent on Feb. 1, W. G. Henderson retiring. The business will be continued by B. C. Trago at 1431 Williamson building.

After a three months' idleness the Scottdale furnace, operated by Corrigan, McKinney & Co., of Cleveland, was put in operation Feb. 1. Great improvements have been made in the plant. The Genesee furnace of this firm at Charlotte, N. Y., has also been blown in and it is expected that the River furnace, Cleveland, will be operation before March 1.

The stockholders of the Colorado Fuel & Iron Co. at a special meeting Feb. 1 amended the articles of incorporation so as to permit an increase in the funded indebtedness of the company. It is proposed to issue bonds to the amount of $45,000,000 in accordance with the plan recently announced.

LODGE & SHIPLEY MACHINE TOOL CO.'S STOCK ROOM.

BY C. F. PEASE.

The stock room of the Lodge & Shipley Machine Tool Co., of Cincinnati, comprises seven sections of shelving, of which four are seen in Fig. 1. These sections are each 25 feet long,

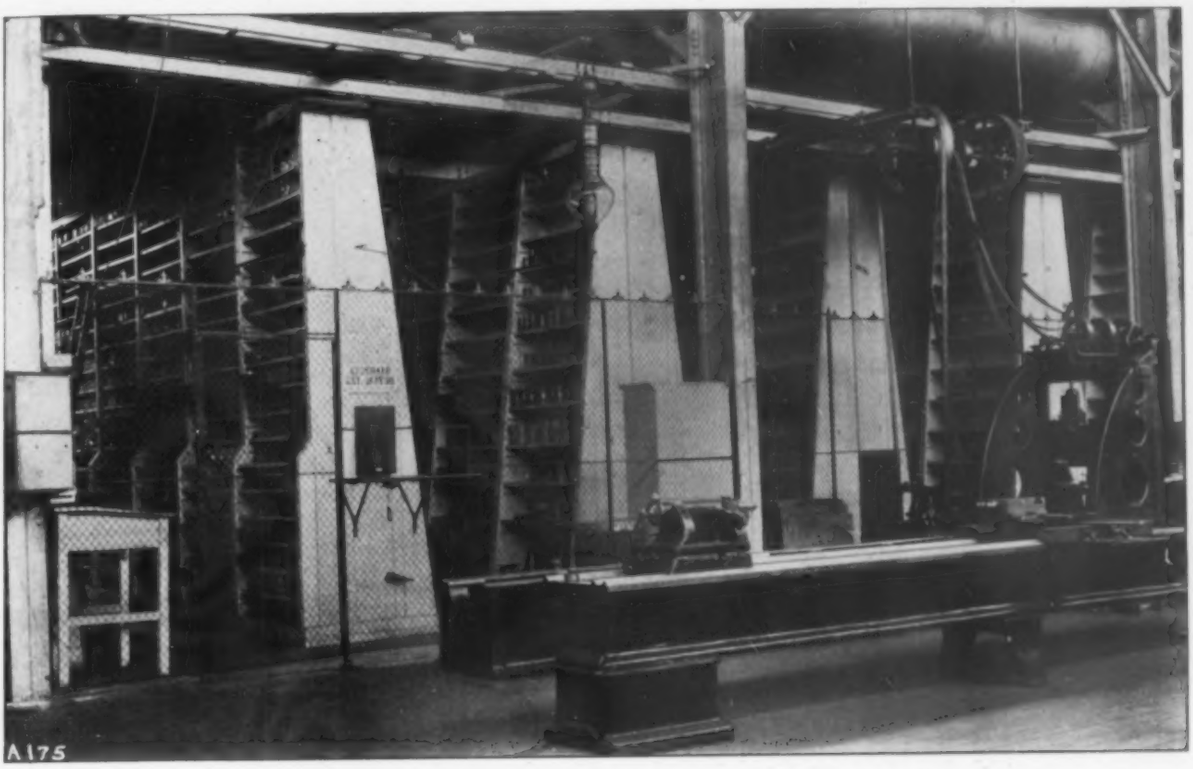


FIG. 1.—STOCK ROOM OF THE LODGE & SHIPLEY MACHINE TOOL CO.'S PLANT.

extend to the ceiling, and each is provided with two bicycle step ladders running on a floor track. The first section is assigned to screws exclusively, and is arranged by numbers in consecutive order, low numbers for small screws at the top, and the high numbers for large screws at the bottom.

One side of the second section is devoted to nuts, keys, pins,

FIG. 2.—STOCK ROOM BOX.

washers, bolts, etc., each item of which is known by number and arranged in regular order so as to be located quickly. The balance of the shelving is devoted to small finished parts of lathes, and is so divided as to assign a place to every small piece of each size tool.

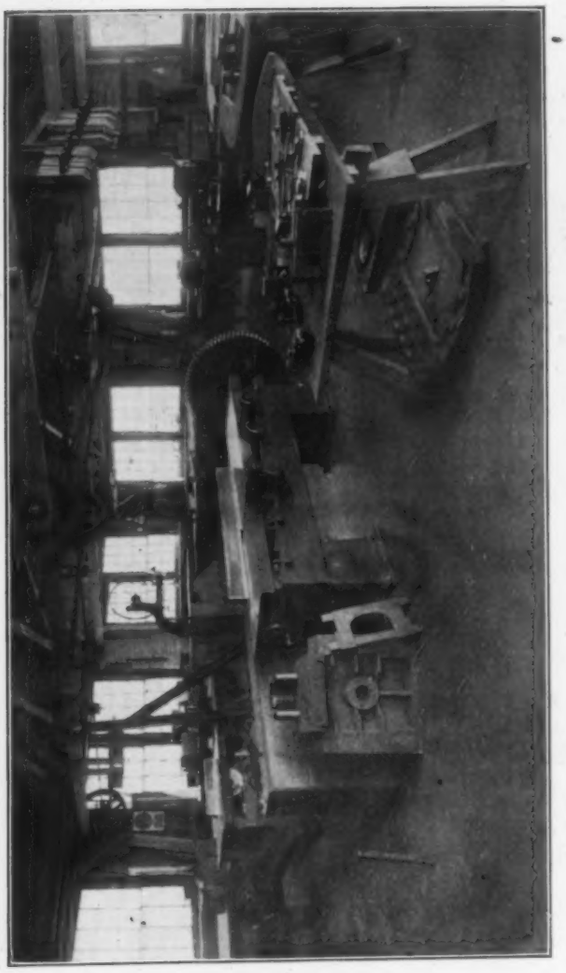
The shelves are all marked for the sizes of lathes by symbols, the smallest size at the top and the largest at the bottom shelving. The system of numbering gives a like piece the same number with symbol letter of each size. Therefore by placing the part numbers at the top of the shelving, as shown in illustration, we have the entire set of shelving numbered and indexed. To illustrate: Part D-697 would be found under number 697 on shelf "D." The stockkeeper's desk contains a complete card index covering all stock in this department.

At the extreme left in Fig. 1 is shown a drawing rack on which is mounted blue prints of screws and part lists, giving numbers and sizes of all screws, nuts, keys, bolts, etc., carried in stock, and is used by the workmen for reference in selecting the odd parts as they may be required. All screws and stock given out for lots of machines under construction are issued from orders made out in the superintendent's office sometime before being needed in construction. The parts are placed in large compartment boxes, as shown in Fig. 2, and each box marked for the department to which it belongs. The boxes are padlocked and held ready for delivery when required. This cuts down to a minimum the running to the stock room for small lots of material, and insures a full supply of parts for each lot of machines in good season.

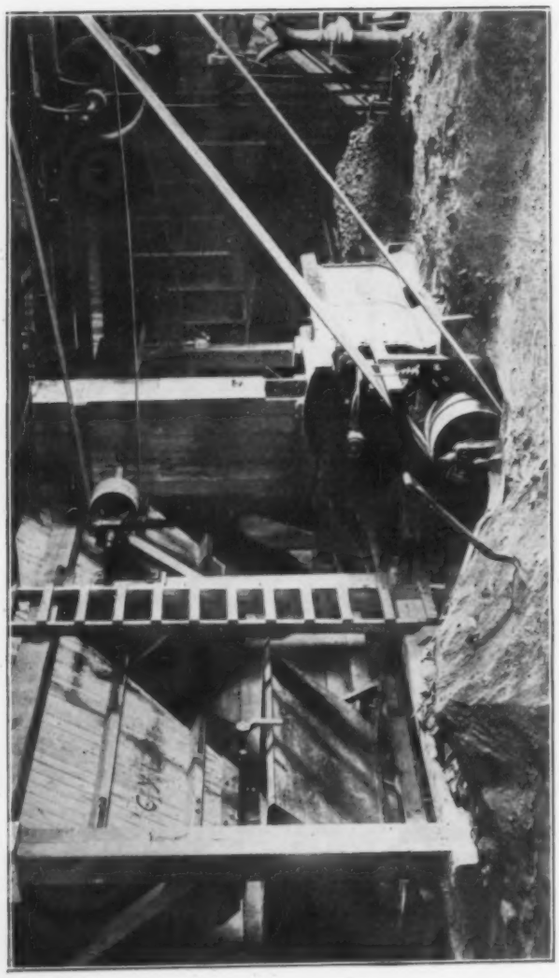
In addition to the card index in the stockkeeper's desk, a card index of all purchased stock is maintained at the desk of the purchasing agent, who orders stock ahead of requirements to always maintain a fixed minimum quantity.

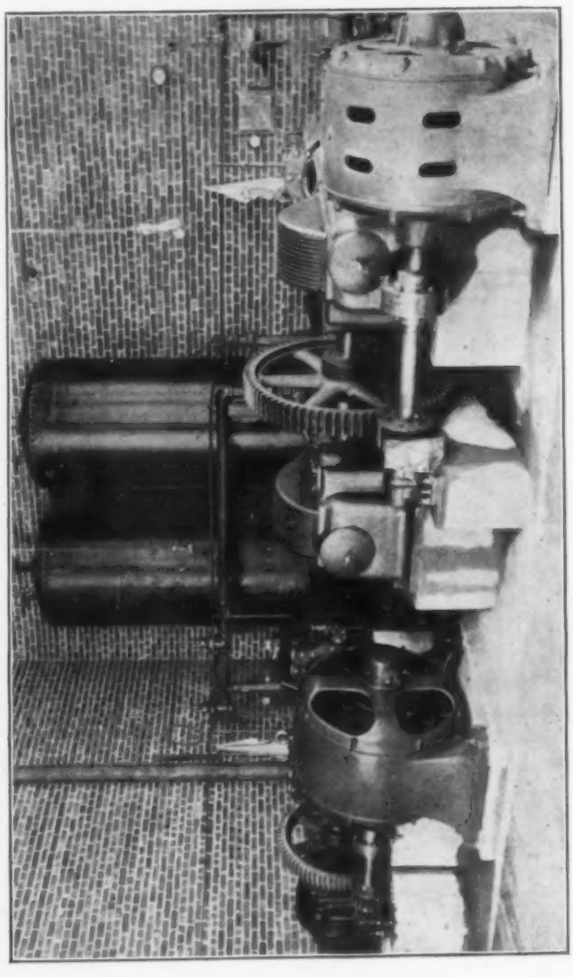
U. S. Consul-General Julius G. Lay, Barcelona, Spain, writes as follows: "It is probable that Spain will jealously protect her steel industries by a high tariff, but it seems to me that we ought to be able to take a very large part in supplying Spain with all necessary plants for the erection of her new and the enlargement of her old iron and steel works. The plants will certainly be required, and it ought not to be difficult to convince the intending buyers that it would be to their interest to order their machinery from the United States."

The American Water Softener Co., of Philadelphia, opened a branch office on Jan. 1 in the Outlook building, Columbus, in the immediate charge of W. H. P. Fisher, general sales agent for the company, and A. C. Tomlinson, manager of the Columbus office, who for some time was assistant manager of the Philadelphia office.



SECTION OF PATTERNMAKING DEPARTMENT.
YARD CRANES, COKE BINS AND CHARGING PLATFORMS.





FACING SAND MIXER AND BINS.
THE AUTOMATIC AIR COMPRESSORS. ONE FOR CLEANING CASTINGS BY SAND BLAST, THE OTHER FOR RAMMERS, CHIPPING HAMMERS AND JIB CRANES.

THE AUTOMATIC AIR COMPRESSORS. ONE FOR CLEANING CASTINGS BY SAND BLAST, THE OTHER FOR RAMMERS, CHIPPING HAMMERS AND JIB CRANES.

YARD CRANES, COKE BINS AND CHARGING PLATFORMS.

STEEL CORPORATION OUTPUT IN 1901 AND 1902.

In the current issue of the *Bulletin* of the American Iron and Steel Association statistics are given showing the total production of the United States Steel Corporation's subsidiary companies in various lines in 1902, as compared with the total production in the same lines for the entire country. These totals, compared with similar ones for 1901, make the interesting showing given below.

Iron Ore Shipments and Production—Gross Tons.	Calendar Year, 1902				Calendar Year 1901			
	By U. S. Steel Corporat'n	By Independent Companies	Total Shipments and Product'on	Percentage U. S. Steel Corporat'n	By U. S. Steel Corporat'n	By Independent Companies	Total Shipments and Product'n	Percentage U. S. Steel Corporat'n
Shipments of iron ore from the Lake Superior region	15,836,806	11,734,315	27,571,121	57.4	12,692,213	7,897,024	20,589,237	61.6
Total production of iron ore	16,093,179	19,288,256	35,351,435	45.4	12,692,213	16,195,266	28,887,479	43.9
Iron and Steel Actually Produced—Gross Tons.	**Product'on by U. S. Steel Corporat'n**	**Product'on by Independent Companies**	**Total Production**	**Percentage U. S. Steel Corporat'n**	**Product'on by U. S. Steel Corporat'n**	**Product'on by Independent Companies**	**Total Production**	**Percentage U. S. Steel Corporat'n**
Bessemer, basic, and low-phosphorus pig iron	7,731,724	4,698,034	12,431,758	62.2	6,460,847	4,584,796	11,045,643	58.5
Spiegeleisen and ferromanganese	172,718	40,263	212,981	81.1	190,485	100,976	291,461	65.4
Forge, foundry, malleable Bessemer, and all other kinds of pig iron	69,088	5,107,480	5,176,568	1.3	152,656	4,388,594	4,541,250	3.4
Total pig iron, includ'g spiegeleisen and ferromanganese	7,975,530	9,845,777	17,821,307	44.8	6,803,988	9,074,366	15,878,354	42.9
Bessemer steel ingots and castings	6,759,210	2,379,153	9,138,363	74.0	6,113,588	2,599,714	8,713,302	70.2
Open-hearth steel ingots and castings	2,984,708	2,703,021	5,687,729	52.5	2,746,996	1,909,313	4,656,309	59.0
Total Bessemer and open-hearth steel ingots and castings	9,743,918	5,082,174	14,826,092	65.7	8,860,584	4,509,027	13,369,611	66.3
Bessemer steel rails	1,920,786	1,014,606	2,935,392	65.4	1,719,076	1,151,740	2,870,816	59.9
Structural shapes	753,481	546,845	1,300,326	57.9	629,733	383,417	1,013,150	62.2
Plates and sheets, including black plates for tinning	1,583,865	1,081,544	2,665,409	59.4	1,456,897	797,528	2,254,425	64.6
Wire rods	1,126,826	447,467	1,574,293	71.6	1,059,859	306,075	1,365,934	77.6
All other finished rolled products, including bars, skelp, cut nails, open-hearth steel rails, iron rails, etc	1,701,700	3,766,996	5,468,696	31.1	1,324,393	3,520,609	4,845,002	27.3
Total of all finished roll products	7,086,658	6,857,458	13,944,116	50.8	6,189,958	6,159,369	12,349,327	50.1
Wire nails.....kegs of 100 pounds	7,122,354	3,859,892	10,982,246	64.9	6,446,938	3,356,884	9,803,822	65.8

TRADE PUBLICATIONS.

A pamphlet describes powerhouse auxiliary machinery for vacuum making and boiler feeding recently developed by the George F. Blake Mfg. Co., of New York. The lists include rotative dry vacuum pumps, vertical cross-compound, simplex, boiler feed pumps, admiralty type surface condensers with combined air and circulating pumps, vertical twin air pumps, combined pot-valve, outside-packed-plunger duplex feed pumps and centrifugal pumps for circulating condenser water. This apparatus has been designed to meet the exact requirements of steam-turbine and reciprocating engine units of 5,000 to 10,000 h. p. capacity, using steam of 200 to 300 lb. pressure per square inch.

The industrial railway catalogue of the C. W. Hunt Co., of New York, has a large number of illustrations showing many and varied types of cars, standard and special, and contains valuable information relating to industrial railway installations.

Catalogue No. 25, from the Fox Machine Co., of Grand Rapids, Mich., treats of the line of trimmers and outlines the variety of work these tools are capable of handling in pattern making and other trades where accurate joints in wood are essential.

Jeffrey machinery for the sawmill, lumber and woodworking industries is the burden of catalogue 57-A from the Jeffrey Mfg. Co., of Columbus, O. The illustrations are reproduced from photographs of the machinery in actual use and submit a general idea of a line of elevating and conveying apparatus which can be adapted to almost any industry. A very thorough index is a useful feature of the catalogue.

Power installation in the new shops of the Mexican Central Railway Co. at Aguascalientes is discussed in Bulletin 3, series C, of the D'Olier Engineering Co., of Philadelphia. The power transmission is entirely on an electrical basis and the high price of fuel ($10 in gold per ton) renders the equipment of an interesting character on the score of efficiency in application to a plant comprising over 20 buildings and yards of some 120 acres in extent. The pamphlet is freely illustrated.

The crane catalogues from the Case Mfg. Co., of Columbus, O., give detailed specifications and are profusely illustrated. A series of halftones depicts the cranes in actual service as well as in constructional detail. An impressive halftone presents a view of a 78-foot girder which was dropped 47 feet onto hard clay, a careful scrutiny failing to find material injury resulting from so vigorous a test. Some novel shop cranes and ingot handling machines are given space with other and more standard types.

Some circulars from the Fort Wayne Electric Works, of Fort Wayne, Ind., give respectively a list of plants operating single-phase alternators in the United States on Dec. 1, 1903; the installation of a multiple arc lighting unit, and instructions for handling arc lamp equipment.

The list of machine molded and pattern gears known as Catalogue No. 27, prepared by the H. W. Caldwell & Son Co., of Chicago, is something more than a gear list, though tabular matter of that description forms the major portion of the contents. This company has purchased the Walker gear molding machinery and patterns, and the present publication contains the paper by John Walker on his system of gearing, the Walker as well as the Caldwell system of numbering and indexing gears and incidentally illustrating the method by which different minds attain a desired end; the determination of gears for various angles, etc., and sundry tables, interesting and useful.

A number of pamphlets deal with the 6 x 48-inch, the 22-inch and the 24 x 27-inch semi-automatic turret lathes built by the American Turret Lathe Co., of Warren, Pa. These are illustrated and described at some length.

The completion of 50 years of business has suggested the preparation of a circular which briefly follows the changes in the firm of Queen & Co., of Philadelphia, since 1853. A number of views of the various departments are shown and mention is made of the equipment manufactured for use in iron and steel laboratories, etc.

The pneumatic tools, hammers, hose couplings, etc., manufactured by the Thomas H. Dallet Co., of Philadelphia, describe with minuteness the final form evolved by the apparatus since the inception of the company in 1883. The engravings are very noticeable and the pamphlet in matter, arrangement and typographical work must make a favorable impression.

Various sizes of the lathes built by the F. E. Reed Co., of Worcester, Mass., are given description in recent circulars. Among them is the 24-inch special turning lathe with the patented tool posts invented by the shop superintendent, John R. Back. This machine and others have been newly designed to meet the demands of the latest developments in tool steels.

Calendars not previously acknowledged have been received from the Becker-Brainard Milling Machine Co., of Hyde Park, Mass.; the Lumen Bearing Co., of Buffalo, N. Y.; the *American Blacksmith*, of Buffalo, N. Y., and the Standard Tool Co., of Cleveland.

"Elevator and Power Transmission Machines" is the title of the fourth in the series of catalogues sent out by the Minneapolis Steel & Machinery Co., of Minneapolis, Minn., and the first since the organization of the new company. The catalogue is a concisely arranged list of gears, clutches, belt tighteners, conveyors and elevator equipment generally, with a comprehensive index, and extends to 213 pages.

Catalogue No. 2, of the St. Louis Machinists' Supply Co.,

of St. Louis, Mo., covers some 212 7 x 10-inch pages, bound attractively in black leatherette with edges and title in gold. The illustrations give a complete shop outfit of small tools and supplies, and the assortment is well arranged and indexed.

The F. B. Shuster Co., of New Haven, Conn., presents a new catalogue of automatic wire straightening and cutting machinery and riveting machines which form a part of the standard line of manufacture. Some special types of straightening and cutting machines for handling scrap and sheet metal are also illustrated to show the work done in meeting unusual requirements of customers.

The catalogue of Geo. D. Walcott & Son, of Jackson, Mich., is an excellent specimen of the printing art and the illustrations are particularly fine. The company manufactures engine lathes, shapers, rack cutters and special tools.

The Iron Sanitary Mfg. Co., of Chicago, has a pamphlet on the sewer flushing fittings and back water gates invented by James J. Wade and made by this company.

The story of the Geary water tube boiler is told in a 9 x 12-inch pamphlet with a number of halftones in duotone illustrating the boiler in detail and as installed. The boiler is made by the Oil City Boiler Works, of Oil City, Pa.

THE HANGING ROCK REGION.

IRONTON, O., Feb. 1.—The lease of the Hecla Charcoal Iron Co. on the blast furnace property of the Hecla Iron & Mining Co. expires this summer and it is understood that it will not be renewed. The supply of charcoal and native ore is about worked up. It is understood that the superintendent, Col. E. J. Bird Jr., will devote his attention to the development of the business of the Ironton Disc Plow Co. when the furnace business is closed up.

The plant of the Ironton Foundry, owned by J. C. Snyder, S. P. Humphrey and E. T. Belcher, was sold last week to W. L. Brammer and M. B. Giberson, of Muncie, Ind. The new owners will operate the foundry as soon as the lease of the Ironton Disc Plow Co. expires in May. The latter company has plans for a foundry building to be erected in connection with its plant.

The Ironton Corrugated Iron Co. has re-elected the following officers: President, Charles Horn; vice president, J. D. Foster; secretary, treasurer and general manager, Thos. W. Price. A handsome dividend was declared at the annual meeting.

At the annual election of the Kelly Nail & Iron Co., Oscar Richey was re-elected president; I. A. Kelly, of Ashland, Ky., vice president; and T. J. Hayes, secretary and treasurer.

The Portsmouth Steel Co. is said to be contemplating the erection of a blast furnace on land adjoining the plant at Portsmouth. It is announced that the company's steel plant will resume the latter part of this week. The operation of the company's plant at Wheeling has been greatly hampered by the high water in the Ohio and this necessitated an earlier resumption of the Burgess mill.

The labor troubles at the Huntington plant of the American Car & Foundry Co., have been adjusted, the men accepting a reduction averaging about 10 percent. The shops are now in full operation.

The Belfont and Kelly mills here and the Norton mill at Ashland, Ky., notified their wire drawers last week of a 20 percent decrease in wages, effective Feb. 1. The Wiredrawers' Union held a meeting Saturday evening and it is understood that they desired to open negotiations with the company. The manufacturers claim that, even with the reduction, the wages will be above those paid in other mills. As all three mills are preparing for full resumption and trade conditions are known to the men, it is thought that the reduction will be accepted.

The directors of the National Can Co., Detroit, have elected these officers: T. D. Buhl, president; D. M. Ireland, vice president; Neil McMillan, secretary; F. T. Ducharme, treasurer. It was decided to raise $60,000 additional working capital, all of which has been subscribed by directors of the company.

Pig Iron Production in 1903.

In our last issue a brief summary was given of the statistics of pig iron production in the United States in 1903 just gathered by the American Iron and Steel Association, a direct report being received from every blast furnace in the country. The total production of pig iron in 1903 was 18,009,252 gross tons, against 17,821,307 tons in 1902, 15,878,354 tons in 1901, 13,789,242 tons in 1900, 13,620,703 tons in 1899, and 11,773,934 tons in 1898. The following table gives the half-yearly production of pig iron in the last four years, in gross tons.

	1900.	1901.	1902.	1903.
First half	7,642,569	7,674,613	8,808,574	9,707,367
Second half	6,146,673	8,203,741	9,012,733	8,301,885
Total	13,789,242	15,878,354	17,821,307	18,009,252

The production of 1903 was 187,945 tons in excess of that of 1902, but the production in the second half of 1903 was 1,405,482 tons less than in the first half. This was a very great decline to occur in six months, and wholly unprecedented. Prices of pig iron began to weaken noticeably in April, and from that month until the end of the year there was a steady decline in prices. It was not, however, until October that production began to decline rapidly, and there was a progressive decline in November and December.

The whole number of furnaces in blast on Dec. 31, 1903, was 182, against 320 on June 30, 1903, 307 on Dec. 31, 1902, and 266 on Dec. 31, 1901. The number in blast at the end of 1903 was the smallest at the close of any calendar year since Dec. 31, 1896, when 159 furnaces were in blast. The production by States was as follows:

TOTAL PRODUCTION OF PIG IRON.

States	Blast Furnaces				Production Gross tons of 2,240 lbs. (Includes Spiegeleisen)		
	In blast June 30, 1903	Dec. 31, 1903			First half of 1903	Second half of 1903	Total for 1903
		In	Out	Total			
Massachusetts	1	1	1	2	1,419	1,846	3,265
Connecticut	2	2	1	3	7,142	7,359	14,501
New York	12	7	12	19	270,443	282,474	552,917
New Jersey	6	7	5	12	106,387	105,280	211,667
Pennsylvania	125	57	95	152	4,498,038	3,713,462	8,211,500
Maryland	4	4	2	6	166,801	157,769	324,570
Virginia	19	12	15	27	322,529	221,505	544,034
N. Carolina	1	.....	1	1	34,001	41,601	75,602
Georgia	4	4	1	5	737,870	783,528	1,561,398
Alabama	34	30	19	49	5,023	6,630	11,653
Texas	1	1	3	4	106,970	92,043	199,013
West Virginia	3	.....	4	4	53,034	49,407	102,441
Kentucky	4	3	5	8	227,259	191,109	418,368
Tennessee	15	14	8	22	1,860,334	1,427,100	3,287,434
Ohio	49	22	40	62	838,655	853,720	1,692,375
Illinois	17	4	17	21	111,963	132,756	244,709
Michigan	10	10	2	12	157,241	126,275	283,516
Wisconsin	6	3	3	6			
Minnesota	1	.....	1	1			
Missouri	2	1	1	2			
Colorado	4	.....	5	5	162,268	108,021	270,289
Oregon	.....	.....	1	1			
Washington	.....	.....	1	1			
Total	320	182	243	425	9,707,367	8,301,885	18,009,252

The production of charcoal pig iron in 1903 was 504,575 tons, against 378,504 tons in 1902 and 360,147 tons in 1901. The production of mixed charcoal and coke pig iron in 1903 was 927 tons, all made in the first half of the year in Wisconsin and Washington, against 11,665 tons in 1902, 23,294 tons in 1901, and 44,608 tons in 1900. The production according to fuel is given in the following table, which shows also the unsold stocks in makers' hands according to fuel at the end of the four half years terminating June 30, 1902, Dec. 31, 1902, June 30, 1903, and Dec. 31, 1903:

UNSOLD STOCKS AND PRODUCTION ACCORDING TO FUEL.

Fuel.	Stocks Unsold Gross tons of 2,240 lbs.				Production Gross tons of 2,240 lbs. (Includes Spiegeleisen)		
	June 30, 1902	Dec. 31, 1902	June 30, 1903	Dec. 31, 1903	First half of 1903	Second half of 1903	Total for 1903
Bituminous	21,621	38,645	97,694	407,881	8,401,001	7,191,220	15,592,221
Anthracite	4,715	4,080	15,673	62,901	1,072,722	838,625	1,911,347
Charcoal	3,525	7,226	12,934	120,656	232,717	272,040	504,757
Charcoal and coke	.....	.....	.....	.....	927	.....	927
Total	29,861	49,951	126,301	591,438	9,707,367	8,301,885	18,009,252

The stocks of pig iron which were unsold in the hands of manufacturers or which were under their control in warrant yards and elsewhere at the close of 1903, and were not in-

tended for their own consumption, amounted to 591,438 tons, against 126,301 tons on June 30, 1903, and 49,951 tons on Dec. 31, 1902. On Dec. 31, 1903, the American Pig Iron Storage Warrant Co. held in its yards 47,200 gross tons of pig iron. Of this total 40,149 tons are included in the above table as being still controlled by the makers, leaving 7,051 gross tons of pig iron in other hands on the date named. On June 30, 1903, and on Dec. 31, 1902, the company had no pig iron stored in any of its yards. The quantity stored on June 30, 1902, amounted to 1,000 tons, and on Dec. 31, 1901, it amounted to 3,000 tons. The distribution of unsold stocks at the end of the last four half-year periods is shown in the following:

TOTAL STOCKS OF UNSOLD PIG IRON.

States	Gross tons of 2,240 lbs.			
	June 30, 1902	Dec. 31, 1902	June 30, 1903	Dec. 31, 1903
Massachusetts and Conn.	463	229	477	3,452
New York	712	2,661	4,895	12,932
New Jersey	241	709	2,100	9,892
Pennsylvania	9,279	5,122	24,413	106,472
Maryland and Virginia	5,267	6,791	16,726	25,823
North Carolina, Ga., and Tex.			2,416	10,226
Alabama	5,947	22,404	30,619	134,828
Kentucky and West Va.	1,589	1,125	5,316	16,422
Tennessee	1,559	3,554	11,408	22,019
Ohio	1,363	4,457	20,073	72,189
Michigan and Minnesota. Illinois and Wisconsin Missouri and Colorado Pacific States	3,441	2,908	7,828	77,183
Total.	29,861	49,951	126,314	591,438

STOCKS OF PIG IRON IN PENNSYLVANIA AND OHIO.

Pennsylvania.	Lehigh Valley	2,094	150	6,741	33,324
	Schuylkill Valley	1,076	400	1,034	14,079
	Upper Susquehanna V. Lower Susquehanna V.	1,182	2,256	3,941	1,021
	Juniata Valley	3,110	1,598	5,263	19,617
	Allegheny County			800	1,200
	Shenango Valley	886		3,610	9,242
	Miscellaneous bituminous	258		2,754	26,435
Ohio.	Charcoal	589	718	570	1,574
	Mahoning Valley bitum.	364	2,503	7,348	47,849
	Hocking Valley "	300			
	Lake Counties "			915	
	Miscellaneous "				
	Hanging Rock "	389	885	11,107	19,475
	Hanging Rock charcoal	250	1,089	713	4,865

The production of Bessemer and low-phosphorus pig iron in 1903 was 9,989,908 tons, against 10,393,168 tons in 1902. The production of basic pig iron in 1903 was 2,040,726 tons, against 2,038,590 tons in 1902 and 1,448,850 tons in 1901. The production of spiegeleisen and ferromanganese in 1903 was 192,661 tons, against 212,981 tons in 1902 and 291,461 tons in 1901:

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

States	First half of 1903.	Second half of 1903.	Total for 1903.
New York and New Jersey	39,112	90,211	129,323
Pennsylvania	2,783,209	2,429,934	5,213,143
Maryland	165,137	156,647	321,784
Virginia and Alabama	3,299		3,299
West Virginia	106,970	91,718	198,688
Kentucky and Tennessee	9,615	17,241	26,856
Ohio	1,459,443	963,233	2,422,676
Illinois	710,199	676,484	1,386,683
Michigan, Wisconsin, and Minn.	75,096	36,244	111,340
Missouri and Colorado	128,539	47,577	176,116
Total	5,480,619	4,509,289	9,989,908

PRODUCTION OF BESSEMER AND LOW PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO.

Pennsylvania.	Lehigh Valley	37,722	68,462	106,184
	Schuylkill Valley	37,071	40,811	77,882
	Upper Susquehanna Valley			
	Lower Susquehanna Valley Juniata Valley	187,902	180,843	368,745
	Allegheny County	1,738,122	1,538,728	3,276,850
	Shenango Valley	486,722	319,986	806,708
	Miscellaneous bituminous	295,670	281,104	576,774
	Mahoning Valley	525,965	346,793	872,758
Ohio.	Hocking Valley			
	Lake Counties	436,105	279,503	715,608
	Hanging Rock bituminous	52,830	48,142	100,972
	Miscellaneous bituminous	444,543	288,795	733,338

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey	74,828	42,974	117,802
Pennsylvania—Allegheny County	426,970	364,205	791,175
Other counties	439,241	186,837	626,078
Virginia, Tennessee and Alabama	153,861	114,138	267,999
Ohio, Missouri and Colorado	108,903	128,769	237,672
Total	1,203 803	836,923	2,040,726

An interesting table follows. It shows a good increase in Alabama in 1903 over the year preceding, a slight increase in Pennsylvania, a noteworthy increase in New York (Lackawanna Steel Co.), a marked falling off in Ohio and a slight decrease in Illinois.

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1900 TO 1903 BY STATES.

States	Gross Tons of 2,240 Pounds			
	1900	1901	1902	1903
Massachusetts	3,310	3,286	3,300	3,265
Connecticut	10,233	8,442	12,086	14,501
New York	292,827	283,992	401,309	552,917
New Jersey	170,262	155,746	194,380	211,667
Pennsylvania	6,935,935	7,303,257	8,117,800	8,211,500
Maryland	290,073	303,186	304,229	324,570
Virginia	490,617	448,602	537,216	544,034
North Carolina	28,984	27,333	32,315	75,602
Georgia				
Alabama	1,184,337	1,225,212	1,472,211	1,561,598
Texas	10,150	2,273	3,195	11,653
West Virginia	166,758	166,597	183,005	199,013
Kentucky	71,502	68,402	110,725	102,441
Tennessee	362,190	337,139	392,778	418,398
Ohio	2,470,911	3,326,425	3,631,988	3,287,434
Illinois	1,393,393	1,586,850	1,730,120	1,692,375
Michigan	163,712	170,762	155,213	244,709
Wisconsin	184,794	207,551	273,987	283,516
Minnesota				
Missouri	159,204	203,409	269,930	270,289
Colorado				
Washington				
Total	13,789,242	15,878,254	17,821,397	18,009,252

New Books.

"American Compound Locomotives," by Fred. H. Colvin, is an excellently printed work of 142 pages, bound in cloth. The line drawings are numerous and clear, exhibiting the technical features of old and new designs of compounding in a most informing style. There are ten inserts in duotone illustrating the different types of compounds. The book is plainly written and is easily within the range of understanding of those likely to have anything to do with compound locomotives. An especially readable chapter is the historical sketch which briefly describes the salient points developed in pioneer work. The treatise is published by the Derry-Collard Co., of 256 Broadway, New York. Price, $1.50.

The "Metric System" forms a little pamphlet by R. Goltman and Maurice Le Roy, of Montreal, Canada. The authors are cordially in favor of the adoption of metric measurements but the bulk of the material deals with the system in actual use. Numerous examples are directed at a practical knowledge of the units for calculating purposes. The book has 40 3½ x 6-inch pages and is published by the authors. Price, 25 cents.

"Twist Drills, their Uses and Abuses," is a pamphlet prepared by the Cleveland Twist Drill Co., of Cleveland, for general distribution. The text has a number of line cuts and is a practical treatise on increased cutting capacity and greater drill durability. The information is of common utility in shops and will be valuable in connection with any make of twist drill.

The combined revenue of the Duluth, Missabe & Northern and the Duluth & Iron Range roads for 1903 was $8,700,000. Both of these roads are owned by the steel corporation and between them they transported from the mines in Minnesota to the shipping docks at Two Harbors and Duluth about 10,475,600 tons. Of the revenue described $4,100,000 is credited to net earnings. The Duluth & Iron Range road led in earnings from the ore traffic. The Missabe road hauled more ore, but the higher cost of transporattion of the Vermilion ores is supposed to have overcome the difference in tonnage.

The Japanese firm of Mitsui & Co., of Tokyo, Japan, through its representative S. Nnome, placed a contract with the Carnegie Steel Co. this week for 5,000 tons of rails, 75 pounds to the yard, for delivery in Korea. The price is not given.

At the meeting of the stockholders of the Stimpson Standard Scale Co., Milan, Mich., of which Walter F. Stimpson, of Detroit, is president, it was voted to turn the business over to Bruce & Edwards, who are proprietors of the American Sad Iron Co., of Milan. The plant will be enlarged.

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, NO. 150 NASSAU ST., NEW YORK, Feb. 2.

The machinery industry in this vicinity during January showed some improvement over December. So far as actual orders went, the improvement was slight, but as regards inquiries conditions are much better. In this particular more than in any other the month was notable, and many of these were in reference to propositions that were some months old.

In machine tools, the trading was made up of small lots, but totals for the month were of fairly good proportions. Although at the beginning of the month it was expected that some large orders would materialize, we have been unable to obtain information of any. Quite a number of railroad orders were placed, but they were well distributed and no large contracts are noted. The trade is still waiting to hear from some excellent items in this line. The opinion is expressed in some quarters that not until the railroads decide to provide for their rail requirements for the year, can free orders be expected from them for machine tools.

Inquiries from the general trade are being received quite satisfactorily, the most important one of recent origin being from Chicago, for tools amounting, it is conservatively estimated, to about $75,000. It is intimated that the business will not be given out immediately. It is not known definitely whether the tools will be installed at the new Bridgeport (Conn.) plant of the inquiring company or whether they are intended for Chicago. In regard to several other large machine tool orders, referred to in previous reports, nothing new has developed.

In engines and boilers, conditions justify a more favorable review than that given for December. Manufacturers report that inquiries have increased considerably, but when it comes to closing, there is a decided unwillingness to do so for the time being. The inquiries, however, show that there is a large amount of work in sight, and not a little of it belongs to propositions that came to the surface last summer, but were afterwards shelved. The business relates mostly to small units of power, ranging from 100 to 300. Withal there are some larger units of power among them, the majority of which are expected to result in orders very shortly.

In the matter of orders for engines closed, the month was fairly active. The most notable of these was for 1,500 h. p., given by the Iron Clad Mfg. Co., of Brooklyn, N. Y. The order was about equally divided between the Fulton Iron Works, of St. Louis, Mo., and the Harrisburg Foundry & Machine Works, of Harrisburg, Pa. E. W. Ludeman, of 39 Cortlandt street, this city, representing the Fitchburg Steam Engine Co., got the order which the United Dressed Beef Co., of Pittsburg, gave out for one 325-h. p. compound engine, and one 225-h. p. single engine.

In electrical machinery, the month was moderately active, but not in some time was any month more prolific of small orders. There are some good sized contracts in sight, and many of these will undoubtedly be closed during the present month. In woodworking machinery a quickening in demand is reported, and some good business was closed by the leading interest. The machinists' supplies trade was only moderately active. Makers of special machinery say the new year opened up very well for them.

Prices, as a whole, are being well maintained, especially by machine tool men. The latter assert that any orders in their line are not being withheld because of the prices quoted and are willing to wait, therefore, until the controlling reasons have disappeared, when they count on making sales without being expected to shade present price schedules.

During the month lathe manufacturers held a meeting in this city, and took extra precautions to see that no concessions were made. The meeting brought some representative machine tool men from Cincinnati to this city, who said that present sales were not large, but they expected they would be by the advent of the spring months at the latest.

The export machinery trade for the month is slightly improved. Machine tool men who have been trying to market their products abroad say they would meet with better success if merit instead of cheapness were the controlling factor in a sale. As it is, they report that many Continental buyers ask the price of a machine first, and if this does not strike their fancy, they are apt to give only scant attention to what is said regarding the efficiency of the machine.

The Niles-Bement-Pond Co.'s January business was a little better than that booked in December. It reports that railroads have not as yet given any intimation as to when they will buy the equipment they need. This company's foreign business has been made up of some pretty fair orders recently. It does not expect much improvement in machine tools before spring.

The American Woodworking Machinery Co. reports that the new year has opened up exceedingly well. The company received an order for a complete woodworking machinery outfit from the Camp Mfg. Co., of Franklin, Va., which amounted to over $20,000. It also booked several orders for woodworking tools from furniture manufacturers in the South and West, which aggregated $3,500 to $4,000 each. The company finds the demand from planing mills forms the source of the majority of orders booked nowadays. An official of the company said he looks for a quiet situation for several months to come.

The Crocker-Wheeler Co. got the contract for the complete electric power equipment for the battleship that is now being built at the Brooklyn navy yard. It amounts to over $50,000. Another good Government order received by the company was for the electrical equipment for the machine shop of the Washington navy yard, which amounts to $20,000. The remaining business closed by the company during January was confined to small orders, which made a fairly good total.

Paul Bigelow, representing the Buckeye Engine Co., at 39 Cortlandt street, got an order for a 200-h. p. engine from the Union Bag & Paper Co., of Ballston, N. Y. He has several good orders almost closed.

The Prentiss Tool & Supply Co. booked a larger number of orders during January than in December. These were for one and two tools at a time, however.

The MacKenzie, Quarrier & Ferguson Co., Inc., booked an order for a 125-h. p. harvesting engine for shipment to Chile. The company says its inquiries for January were very large, but noted a hesitancy in closing.

The Ingersoll-Sergeant Drill Co. is well pleased with its January business. Foreign orders have grown in volume recently. The company takes an optimistic view of the outlook.

Salesmen who have just returned from many parts of the country say that everywhere they go they hear of reductions in working forces, in which machine shops and foundries are well represented. Their experiences in seeking trade have convinced them that the fact that this is a Presidential year is menacing the machinery trade as much as anything else. They declare that this is the excuse for whatever recession in trade has taken place, or is likely to take place.

The Power & Mining Machinery Co., 52 William street, New York, with works at Cudahy, Wis., has received an order from the Elmira Water, Light & Railroad Co., Elmira, N. Y., for a four-cylinder American Crossley gas engine of the opposed type, with cylinders 32 inches in diameter x 36-inch stroke, to run 138 r. p. m. and to develop, under normal load, 1,300 brake h. p. with natural gas containing 1,000 B. T. U. per cubic foot. This engine will be direct coupled to a General Electric 60-cycle alternator of the flywheel type, and will run in parallel with existing steam engines and with such other gas engines as may be installed in the future. This engine will be used for both lighting and power—the direct current for railway work being secured by the use of rotary converters. To the International Steam Pump Co. for its new Harrison, N. J., plant the same company has sold two 11 x 16-foot Loomis-Pettibone gas generators, together with two 10,000-cubic foot holders. This plant is to be used for metallurgical work about the Harrison plant.

The Scottdale furnace of Corrigan, McKinney & Co., Scottdale, Pa., resumed operations this week after an idleness of about three months. The Brier Hill Iron & Coal Co. and the Youngstown Steel Co., of Youngstown, O., are making preparations to place their furnaces in blast some time this month.

The sheet mill of the American Sheet & Tinplate Co., Leechburg, Pa., which has been idle for several months, was placed in operation this week.

A Modern Jobbing Foundry.

The so-called modern American foundries, which have been erected within the past decade, have been in the main specialty shops in one form or another. Where the product of a shop is to be largely repetition work or work in a single line, one is of course justified in incurring greater expenditures for permanent fixtures, that will help to lower the cost of castings, than is the case where orders are accepted for any class of work that comes along. It is a great deal easier to lay out a foundry which is to turn out a definite class of castings than it is to meet the requirements made upon the general jobbing shop.

Another reason why the latter class of foundries is not being modernized as rapidly as those engaged in other lines lies perhaps in the fact that their owners dislike to tear down old works and extensions that are dear to them. It is remarkable how some of the old-time jobbing foundries really manage to make enough money to keep the doors from being closed by the sheriff. They have no facilities for handling material, their molders work under the most unfavorable conditions as regards light, shop equipment and other accessories, which make for a higher output. Yet on work perhaps largely local they manage to eke out a living in a way that satisfies them and the chances are that for many years we shall have a large number of foundries that are a long way from being modern.

INTERIOR VIEW THROUGH MAIN BAY OF FOUNDRY.

Among the jobbing foundries of quite recent construction perhaps none is more completely equipped to turn out "any order that comes along" than the plant of the Buffalo Foundry Co., Buffalo, N. Y. Careful attention has been given to shipping facilities and through the New York Central Belt Line railway an outlet is provided which reaches all the railroads entering Buffalo as well as the steamer lines, which are in operation the greater part of the year. The site selected contains 6½ acres and leaves room for future extensions, whenever these are necessary. The photographic views of the plant as well as the plans give a fair idea of how things are laid out. A standard gauge railway track leads to the main foundry, where castings of the largest size may be placed directly on the cars, and another spur track reaches the storage yard, which is covered by an electric crane, having a span of 79 feet and 6 inches and a runway of 280 feet. A track scale is placed at the junction of the two switch tracks, so that the weight of all material entering or leaving the works may easily be ascertained.

Arrangement for Charging.

It will be noted that the cupola platform, which is 80 x 39 feet 3 inches, has two extensions beyond the foundry building proper, each 9 feet wide and 20 feet long. The pig iron and scrap are kept in piles in the yard and the coke in bins. The charging is accomplished by means of charging barrows which are filled in the yard and raised by the crane to two projections on the charging floor, which extend from the side of the building under the yard crane. Scales are located in the charging floor near these entrances so that all the incoming material may be weighed. The construction of the charging floor is unique. It is made of 6-inch channels laid with the flat side up, the flanges being riveted together. The channels are supported on I-beams. When a floor is made of plates, it is difficult for the men to find footing on the large plates as these are soon worn dangerously smooth. There is just enough irregularity in the surface provided by the channels to afford secure footing for the men and at the same time the hard and partially smooth surface makes an almost ideal floor for the charging barrows. The cupola doors are so placed that the material can be dumped into the cupolas direct from the charging barrows. Each cupola is provided with two doors. The charging floor is made large enough so that the loaded barrows for an entire charge can be brought on to the floor before charging commences, thus reducing the work of the men during the run.

Foundry Lay-out and Crane Service.

The main foundry building is 145 x 320 feet. It is composed of three bays. The central bay and the one opposite the cupola are given up entirely to molding and the cleaning departments. The portion of the bay not taken up by the cupolas and air furnace is occupied by the core making department and a small molding floor for light work. The central floor is

served by two 30-ton electric traveling cranes with 5-ton auxiliary hoists; also by four jib cranes, two of which are equipped with hoists operated by air motors and two with electric motors. These jib cranes are so arranged that the main traveling crane can move them from one post to another. The side floor opposite the cupolas is equipped with two 10-ton traveling cranes. The main molding floor has been dug out to a depth of 15 feet and filled in with molding sand. Before this sand became thoroughly packed cast iron curbs were used around all of the pits, but now that the floor is well packed no curbs are necessary.

For cleaning small castings a sand blast room is provided at one end of the foundry. An exhaust fan is so arranged as to remove as much of the dust as possible from the sand blast table, but, as in all sand blast rooms, it is necessary for the attendant to wear a helmet. One advantage of the exhaust system is that it frees the room from dust almost instantly after the sand blast is turned off. The larger castings are cleaned on the floor at the shipping end of the foundry. The necessary emery wheels, pneumatic hammers and similar appliances are provided for this work.

Core Department.

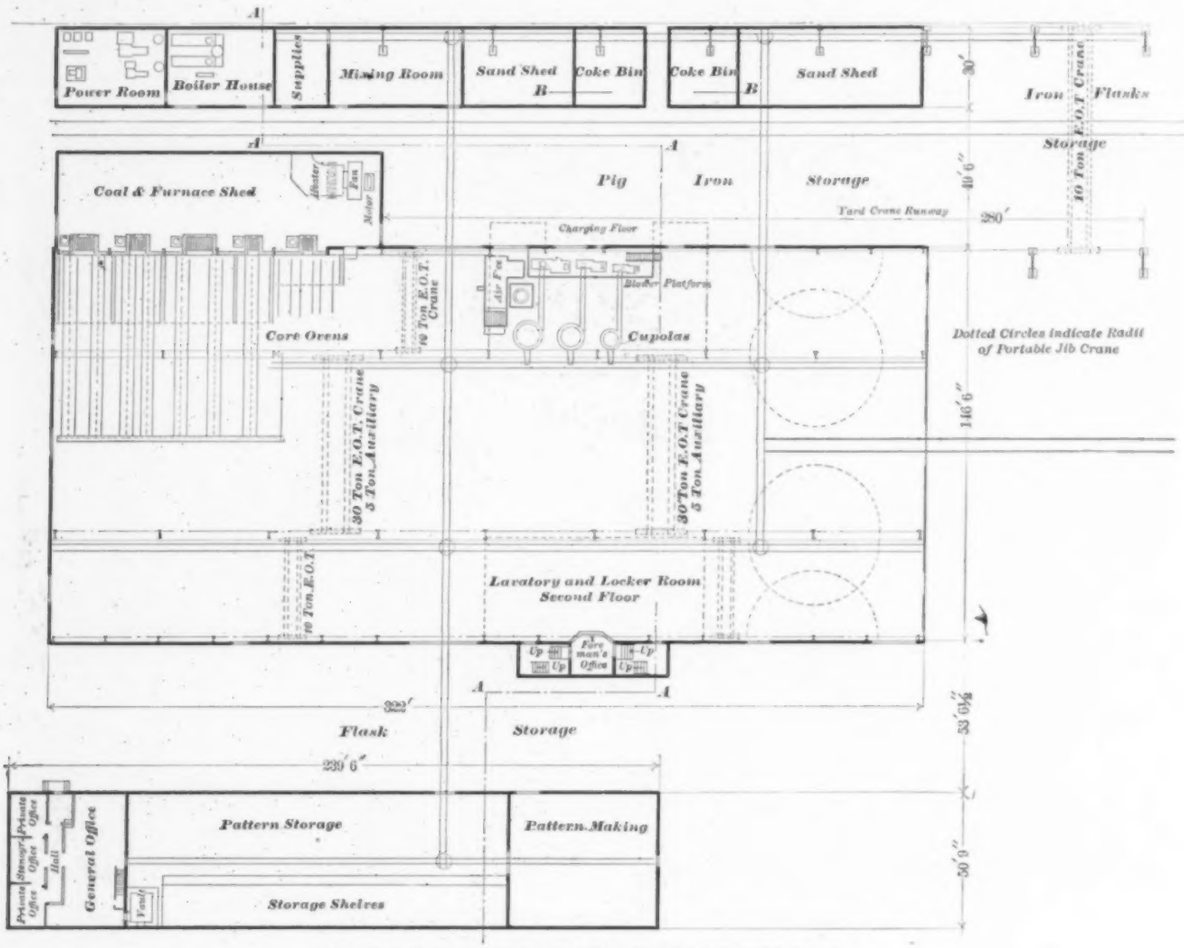
The core department is situated in one end of the bay on the stock yard side of the foundry and at one side of the cupolas and air furnace. This department is served by a 10-ton electric crane which also serves the air furnace. There are four large core ovens fitted with rolling doors 20, 17, 25, and 12 feet wide respectively. For drying small cores there is an ordinary Millet core oven with swinging trays and an oven having three compartments provided with cars carrying a door on each end of each car so that the front of the oven is closed no matter which car is withdrawn. This is really another application of the independent shelf principle, with this difference, that each car becomes a separate unit. The core oven capacity of the Buffalo Foundry Co.'s foundry may be understood when it is stated that this amounts to 30,000 cubic feet, and that molds or cores measuring as much as 25 x 25 x 14 feet can be accommodated.

For making core irons some permanent beds are arranged next to the cupolas in the molding department on the other side of the cupolas from the core department. These beds are surrounded with permanent straight edges inside of which a hard bed is made up. The patterns for the core irons are then placed on these hard beds, sand rammed around them, struck off even with the top of the patterns and the patterns drawn, thus providing open molds. It will be noticed that this method of making core irons is somewhat different from the bedding-in principle used in many shops where a soft bed is prepared into which the patterns are forced.

Storage and Handling of Materials.

Bins are placed in the yard for receiving the general stock of molding sand. Similar bins are also provided for classes of material which are not used in such great quantities. For mixing and tempering the facing sand, a reciprocating sifting and mixing machine is provided. The mixing sand is then elevated into storage bins provided for each class. From these bins it is drawn into barrows and taken to the foundry floor as required. Owing to the fact that in winter the molding sand kept in the bins is liable to freeze into large chunks, they have provided a sand thawing and drying furnace. A rat-proof room is provided in the sand department for storing flour.

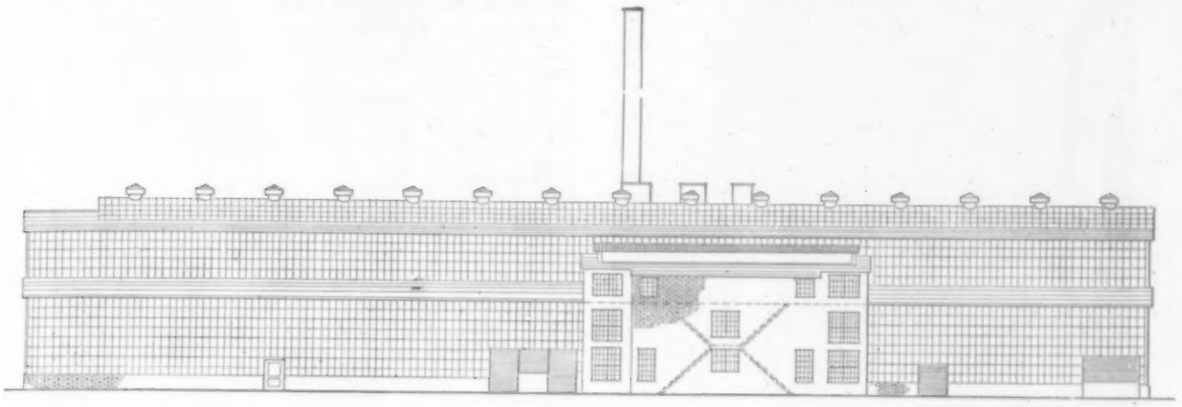
The offices and pattern shop occupy a separate structure, 51 x 240 feet, the greater part of which is given over to pattern storage and shelves so arranged that a pattern may be found on the shortest notice. On the opposite side of the foundry are located the power building, 30 x 80 feet, and the sand mixing and storage building, 30 x 240 feet. An industrial railway system connects all departments and permits of rapidly handling all forms of material. The sectional illustration of the coke bins, each with a capacity of 135 tons, shows a vast improvement in handling fuel over ordinary methods. To relieve the traveling cranes from being tied up with jobs where



GENERAL PLAN OF THE WORKS OF THE BUFFALO FOUNDRY CO.

a crane is almost constantly demanded, portable cranes are provided, which may be placed on columns wherever needed. These cranes are electrically driven and very efficient in handling loads within their capacity.

The melting equipment so far installed includes three cupolas having a diameter of 84, 66 and 48 inches respectively, inside the lining. Each is furnished with an independent blower of the Connellsville type, direct connected to an a. c. electric motor. A reverberatory furnace of 20 tons capacity is available where iron of special quality is desired in castings.



SIDE ELEVATION OF MAIN BUILDING.

The air furnace is specially designed for melting large pieces of scrap, which it does very successfully.

Pattern Storage.

The pattern department is located in a building parallel with the main foundry building. The offices and laboratories are at the front of this building; back of them is located the pattern storage. One-half of the pattern storage is provided with pattern racks for the storage of the smaller patterns. These patterns are kept track of by a card index system. For the present the other half of the building is used for storing the larger patterns upon the floor. Care has been taken in most of the buildings to furnish fire-proof or slow-burning construction. Owing to the fact that a pattern storage is filled with highly combustible material, no attempt was made to make the building especially fire-proof, but there is a light wooden roof which would burn off quickly and allow access to the fire. The pattern shop is located at the other end of the pattern storage building from the office. It is situated on the second floor and is equipped with the best pattern making machinery. As this is a jobbing foundry purely, most of the patterns used are constructed by outside parties, and hence it is not necessary to keep up as extensive an equipment as would be the case in manufacturing any special line. Nevertheless, the equipment installed is of the best and the firm is in a position to make patterns when required.

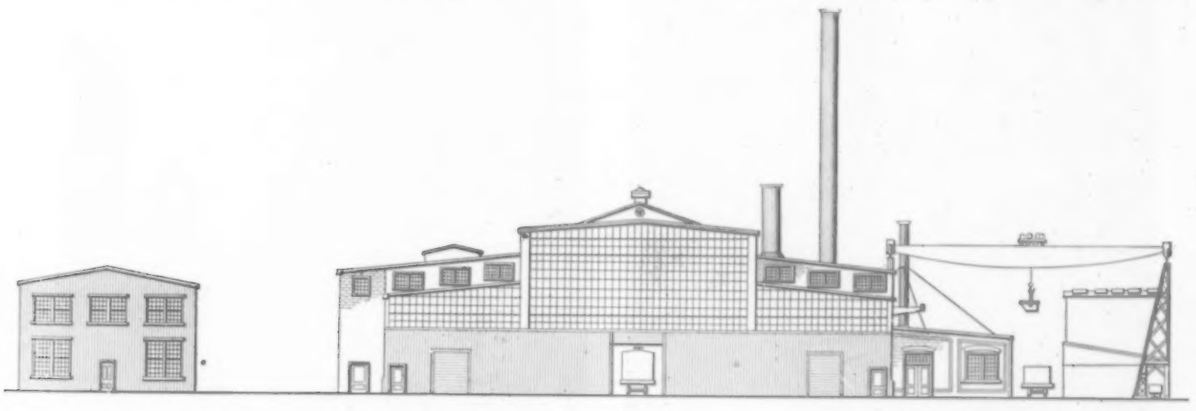
Under the pattern shop is located the flask department where the wooden flasks used in the foundry are made. This department is equipped with a full line of woodworking machinery.

The plant is heated and ventilated by the Buffalo Blower Co.'s system. Two boilers are installed next to the air compressor room for furnishing steam for heating. As all the power about the plant is furnished by electricity from Niagara it is only necessary to fire these boilers during the portion of the year that heat is required in the plant.

Electrical Equipment.

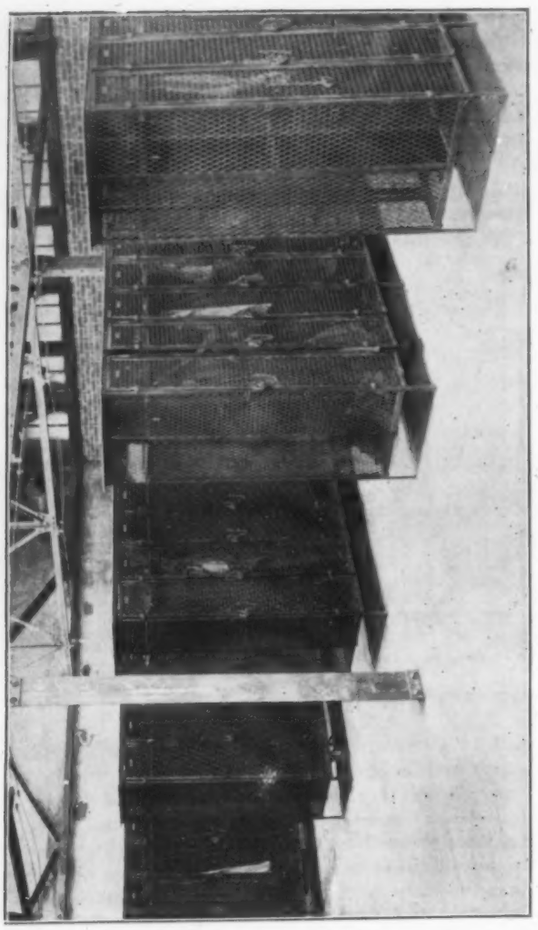
The power and artificial light are furnished by electricity from Niagara. The electricity is paid for by the meter. At times the plant utilizes nearly 500 h. p., and had they installed their own power plant it would be necessary to install boilers and engines capable of generating this amount of power; hence, they would have had to deal with interest and depreciation expenses in this large equipment. They would also have always been subject to the large friction and standby losses incident to a power plant of this size which is sometimes operated to its full capacity, and other times only partially. By actual measurement of the electricity used they found that the average load is only 160 h. p., and this is all they have to pay for. The saving can be appreciated at once.

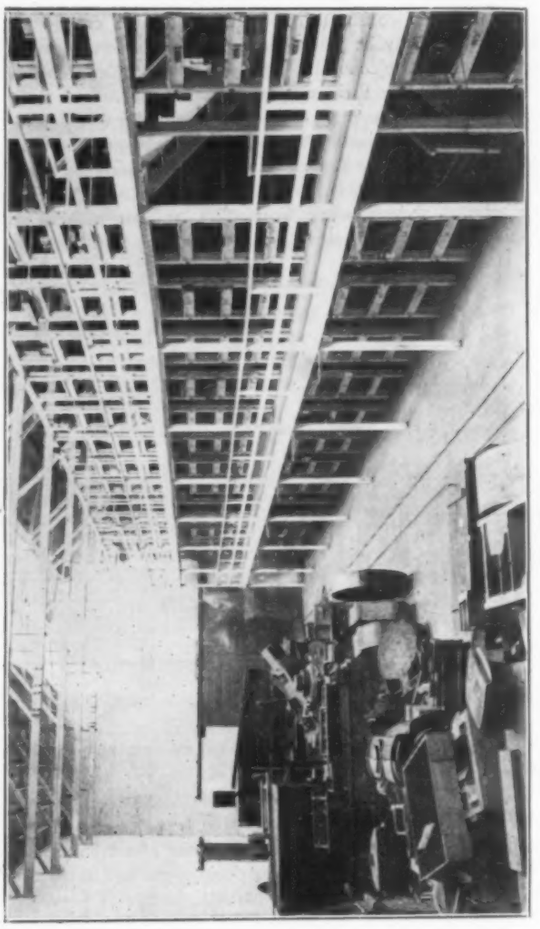
A current of about 2,200 volts is received from the power company and this is cut down in static transformers to 230 volts. Power motors throughout the plant are constant speed alternating current motors. The crane motors are direct current motors, and hence it is necessary to provide a rotary transformer. Two air compressors are provided, one for furnishing air for the two pneumatic cranes, the chipping hammers, etc. This compressor is driven by an alternating motor and is provided with an unloading device so that when no air is being used, only the friction of the machine is to be overcome. The other compressor supplies air for the sand blast cleaning department. This motor is driven by a direct current motor controlled by a Cutler-Hammer controlling switch which automatically stops the motor when the sand blast apparatus is stopped, and starts it again when more air is required. The air compressors are both furnished by the Rand Drill Co.



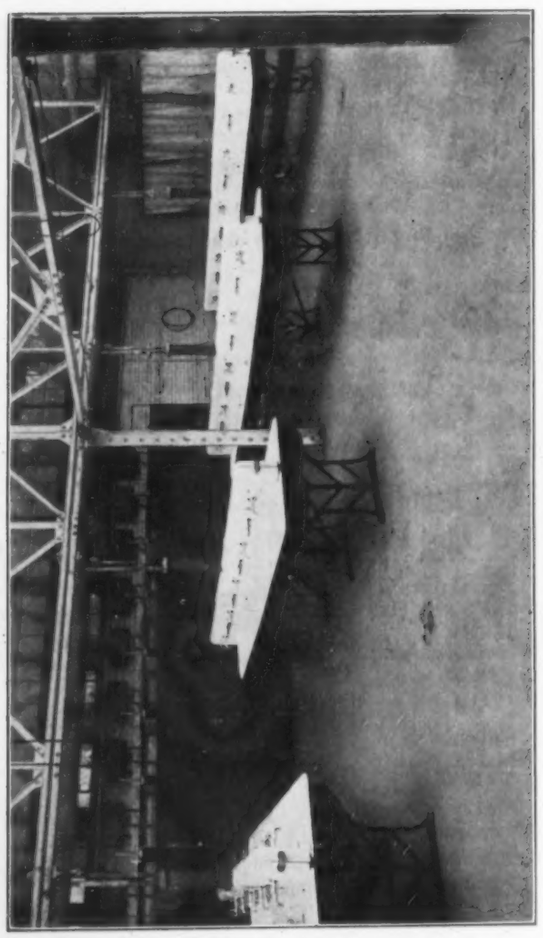
END ELEVATION.

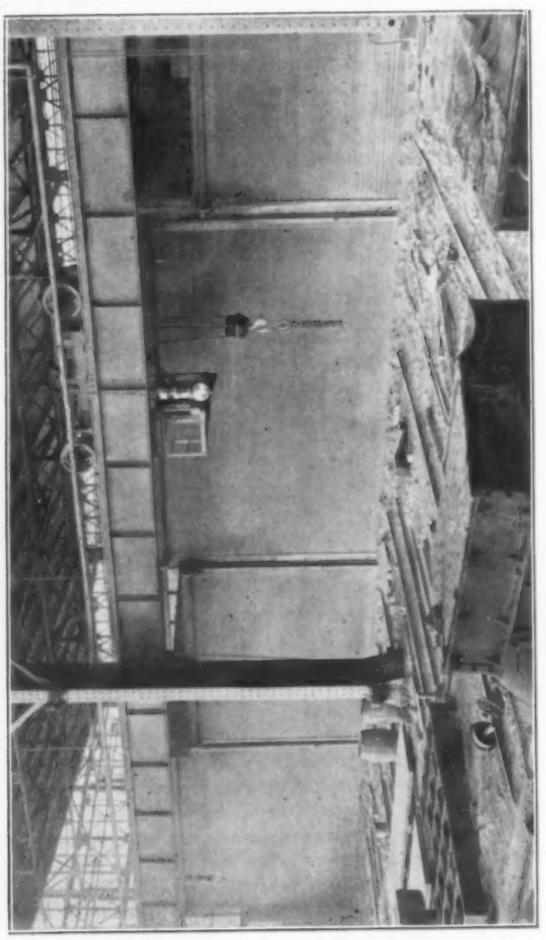
All of the work carried on relating to the constituents of raw materials and the quality of the product, including the





PORTION OF LOCKER ROOM.
SECTION OF PATTERN STORAGE.





WASH ROOM AND SHOWER BATHS.
SOME OF THE LARGE CORE OVENS; 20 17, 25 AND 12 FEET WIDE RESPECTIVELY.

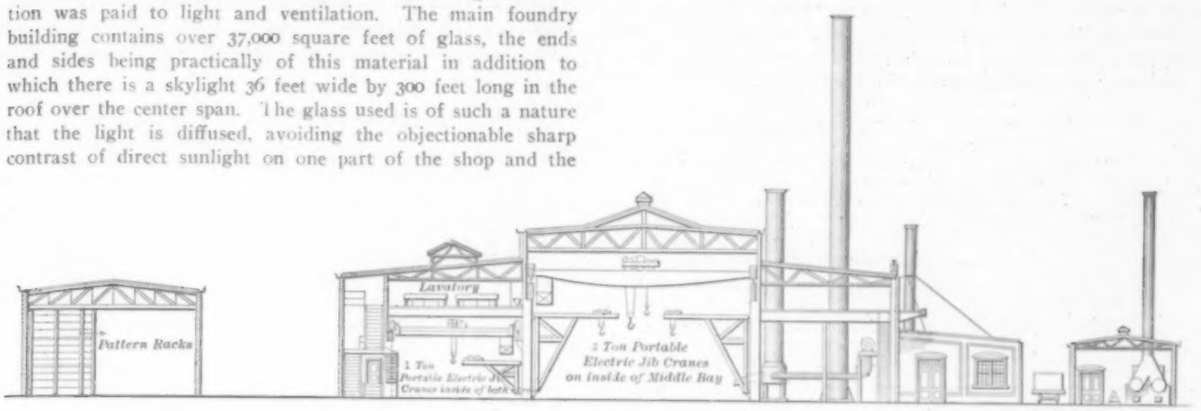
mixtures used, is under the charge of the chemist. He has two laboratories completely equipped, a chemical laboratory for making the necessary chemical determinations and a physical laboratory for the physical tests. In the physical laboratory is a 200,000-pound Riehle testing machine. This equipment and the careful manner in which the work is conducted at the plant permit of fulfilling difficult specifications very easily.

Sanitary and Betterment Features.

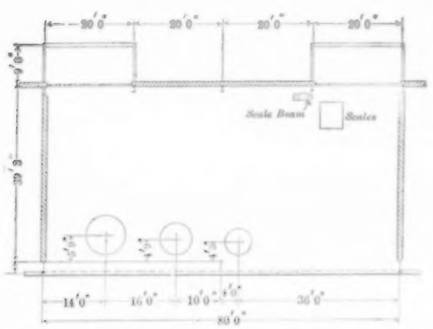
Perhaps no foundry was ever built in which so great attention was paid to light and ventilation. The main foundry building contains over 37,000 square feet of glass, the ends and sides being practically of this material in addition to which there is a skylight 36 feet wide by 300 feet long in the roof over the center span. The glass used is of such a nature that the light is diffused, avoiding the objectionable sharp contrast of direct sunlight on one part of the shop and the remainder in shadow. Everything has been done to secure the best sanitary conditions and convenience for the workmen which a foundry will permit. Individual lockers are at the disposal of the employes and facilities for keeping clean are plentiful. The lavatory and locker room is located in the second story above the central part of the side floor, as is also the foreman's office, from which nearly every part of the foundry may be surveyed.

The wash room has basins equipped with hot and cold water fixtures, shower baths and the necessary toilet equipment. Adjoining this room is the locker room with an ample supply of expanded metal lockers so that each man can be independent.

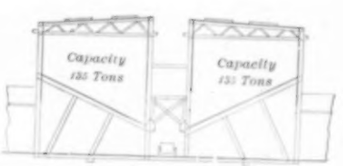
The company was organized three years ago and the present officers are: H. D. Miles, president and treasurer; E. G. Rippel, vice president and superintendent; W. J. Hayes, secretary, who with C. F. Dunbar, M. Sullivan, Andrew Langdon, Lee Langdon and F. L. Dunbar comprise the board of directors.



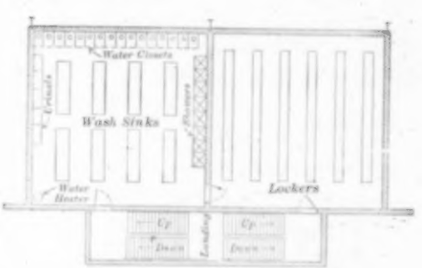
SECTION ON LINE A.A.



PLAN OF CHARGING FLOOR.



SECTION B.B. THROUGH CORE BINS.



PLAN OF LAVATORY AND LOCKER ROOMS.

"Ups and Downs of Iron in '03," is the title of a booklet Rogers, Brown & Co. send out, giving statistics of the iron trade for last year and preceding years. Unfortunately the figures for the year most interesting of all must be estimated, which detracts somewhat from the point of the book. But with a few exceptions, notably pig iron, the approximations are probably near enough to the actual to give value to the comparisons made. The price tables are interesting, one notable page giving prices from the sales books of Rogers, Brown & Co., on No. 2 foundry iron for the past 11 years. In referring to the strides Germany has made in pig iron production in the past few years—nearly 1,700,000 metric tons more in 1903 than in 1902, or from 8,402,660 to 10,085,634 tons—the pamphlet says: "A great share of this increase must be accounted for by the development of the general export trade of Germany. It is another note of warning to the American manufacturer that Germany is to be counted upon from now on as a more and more formidable competitor for the world's trade."

Concerning the recent increase of capital stock of the J. I. Case Threshing Machine Co., Racine, Wis., from $1,000,000 to $2,000,000, that company advises us that the increase was made mainly on account of the rapidly increasing volume of its business, both at home and abroad. This additional stock is fully subscribed and paid in. The company will pursue the same vigorous policy which has characterized it for several years, but is not contemplating any unusual additions to its buildings beyond what appears necessary from year to year to provide for an increasing output.

Bids for the furnishing and delivery in Portland, Ore., of cast iron pipes, stop cocks and valves were opened and considered by the Water Board of that city a few days ago. The United States Cast Iron Pipe & Foundry Co., of Chicago, was awarded the contract for 1,780 cast iron pipes at $31.75 per ton, and 60 tons of special castings at 3 cents per pound; total $60,432.50. The other proposals for the same articles were: Martin Pipe & Foundry Co., San Francisco, $61,569.50; H. A. Heppner & Co., Portland, Ore., $64,740.50; Oregon Iron & Steel Co., Portland, Ore., $65,955, and the Camden Iron Works, Philadelphia, $66,809.15. The Camden Iron Works, Philadelphia, were awarded a contract for Eddy gate valves—20 4-inch at $7.75; 120 6-inch at $12.45, and 60 8-inch at $17.95; total, $2,726. Corbett, Failing & Robertson, Portland, were awarded a contract for Mueller stop cocks, 1200 ¾-inch at 42 cents, and 400 ⅝-inch at 55 cents; total, $724. Hoge & Swith, Portland, were awarded a contract for 40 tons of pig lead at $4.25 per 100 pounds; total, $3,400. The total amount of all four contracts is $67,282.50.

The Tennessee Coal, Iron & Railroad Co. has declared a regular quarterly dividend of 2 percent on its preferred stock, payable Feb. 1.

Two Card Systems for the Shop.

BY H. C. HAMMACK.

A Method of Keeping Employes' Records.

In all large manufacturing establishments, it will be found necessary to keep a comprehensive record of employes. This should be as brief as possible, to avoid unnecessary work, yet it must be complete enough to serve the purpose intended to the best advantage. There are undoubtedly many methods in use, but it will be found that the card index system is more complete and less voluminous than any other method employed for this particular work.

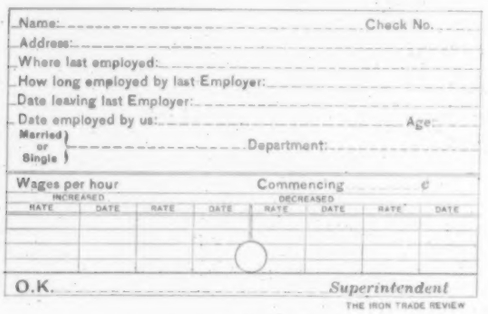


FIG. 1.—RECORD CARD OF EMPLOYES.

Readers of this paper are familiar with the trouble which comes of hiring incompetent men. The class of men that are available to fill positions in the shops, such as all-around machinists, lathe hands, vise men, planer men, boilermakers, etc., are not all of them what you could call the best, by any means, and it is a matter of great importance to know when a man applies for a position whether he ever worked for the company, and if so what was his record. For instance, say a new man comes along, represents himself to be a first-class machinist. You, of course, cannot tell anything in regard to his or any other man's ability until you have tried him. You give him a position, put him to work and after he has worked a day or so, you find out he is not what he represented himself to be and you are compelled to let him go. If you have no way of keeping record of the men you employ, this man might come along in several months and apply for that position or some other, and you, not being able to remember his name or appearance, would hire him over again. This, of course, you want to avoid as much as possible, as it simply causes annoyance and loss of money. And even if you do have a system to

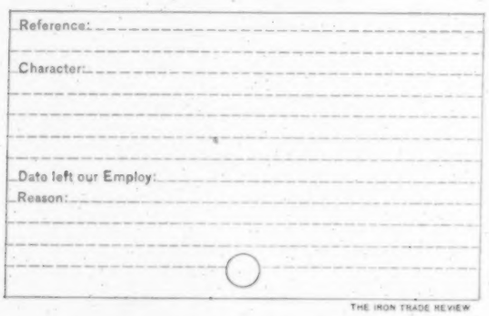


FIG. 2.—REVERSE SIDE OF RECORD CARD.

serve this particular purpose, it may be arranged in such a way that a man's name could be easily overlooked and an occurrence of this kind not be prevented.

Of course there are other points connected with keeping a record of employes where a good system will be found valuable, such as noting progress of men from time to time, so as to know how to make advances in wages when necessary to do so; yet the point which I have related is one of importance, especially at this time, owing to the unsettled condition of machinists and men of other trades.

The system described in the following can be easily comprehended, can be handled with but little work and is inexpensive to install. The first thing is to design a card to use in keeping the record. The points most desired are the following: Name of the man employed; his address; his age; where he was last employed; how long employed there; date leaving there; date you employ him; whether he is married or single; name of the department in which he will work (designating also the class of work he will do in this department); wages; reference and character. Then using the card as a record after he leaves your employ, there should be provided on

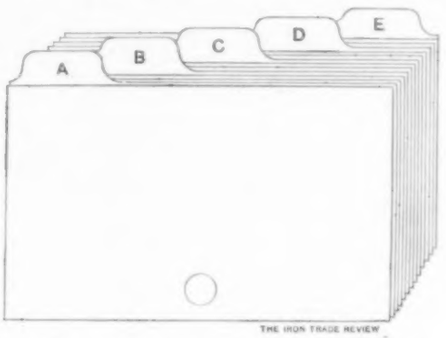


FIG. 3.—ALPHABETICAL INDEX OF EMPLOYES.

your card space for giving the date he leaves and the reason for leaving. The card which I suggest for this purpose is shown in Figs. 1 and 2, Fig. 2 being the reverse side of the card. This card should be filled out and filed in alphabetical guides, Fig. 3, and if this record is kept by the time department or in the office of the superintendent, I would suggest that there be an index for each separate department in the shop, that is, a separate alphabetical index for the machine shop, blacksmith shop, erecting shop, boiler shop, foundry, etc. In this way it would be much easier to locate any particular party in a certain department, than if you were compelled to look over all the cards. Providing you wish to find whether a certain man ever worked for your company before, even in any department, it would only be a matter of running over the cards in each department under the letter in the index where the name of the party you are looking for would be found. Some shops would probably prefer that a record of this nature be kept by the foreman of each department, by reason of the fact that the foremen do the hiring of the men, and if this should be desired it could be provided for in the same manner.

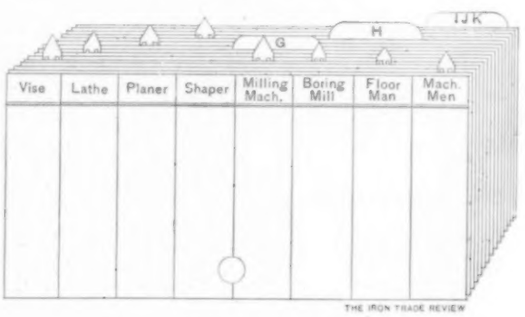


FIG. 4.—MACHINE SHOP CARD INDEX.

Understanding the requirements for such a record, it sometimes might be desirable for the superintendent, foreman or time department to pick out one particular kind of help in one department, and without some special or cross index this could not be done. However, I have a method which will work in here very nicely. Suppose, in the machine shop, you have vise, lathe, planer, shaper, milling machine, boring mill, floor men, and machine men (not otherwise specified): You would file your cards in the alphabetical index guides, as indicated, but in addition to this, in front of the alphabetical index you would

have a card specially ruled. See Fig. 4. Then you would use "steel pointers" which stick up above the cards in line with the section ruled for vise men (as an example), this being the section at the extreme left-hand side of the card; therefore, the pointers on all vise men cards would be placed on each separate card at the extreme left side of the card, and so on. This is the only system whereby cards may be arranged alphabetically and designate some other feature and only use one file.

The steel pointers above referred to can be purchased from the Vetter Desk Works, of Rochester, N. Y. They are inexpensive and they will save much time in a record of this kind.

FIG. 5.—PRINCIPAL FOLLOW-UP CARD.

In going a little further into the benefits of keeping employes' records, it will be found that when a new man is hired and you have his references, the first thing to do is to write to these references for his character and record. In order to save time a form letter, similar to the one following, will be very useful and will get just as good results as if time is taken to write a special letter.

.....19....

.....

.....

Gentlemen:—

Mr. ..... has applied to us for a position as ..... in our shop and states that he was recently in your employ. Will you kindly inform us as to his ability, character, etc., we being particularly desirous of knowing whether in your opinion he would be apt to be a disturbing element in our shop, if employed.

The information which you give us will be treated strictly confidential. Thanking you for a reply and at the same time expressing our willingness to reciprocate the favor should occasion arise, we are,

Yours respectfully,

.....

In these times of strikes and labor troubles it is of the utmost importance that you know as much as possible

QUOTATIONS MADE		ORDERS RECEIVED	
ON WHAT QUOTED	DATE	MATERIAL	DATE

THE IRON TRADE REVIEW

FIG. 6.—REVERSE OF CARD SEEN IN FIG. 1.

about the men you are employing, whether their record has been clear on this point when working for other concerns.

A system such as I have outlined will be found valuable in many ways, not only in keeping the record of your employes but the cards can be used by the time department in making out pay roll and for ready reference for rate of wages for the different men, etc.

A "Follow-up" System for Manufacturers and Jobbers.

While the card index system has become a common thing with many of the aggressive business men, for many purposes, yet it is surprising that it is not applied by more of our business houses in following up and keeping track of quotations and inquiries received from prospective customers. Every office has some way of following up this particular feature of the business, yet the system employed is more complicated and not nearly so easy to handle as a follow up system by a card index.

In the following I will outline a "follow up" system which can be applied to most any kind of business by simply changing the design of the cards to suit the particular line. It must be observed, however, that there are a great many things to overcome in outlining and carrying on a follow up system. If the business be such that

FIG. 7.—GEOGRAPHICAL GUIDE CARD.

the cards which are used to note the quotations, date of inquiry from customer and other features, are of no particular value after one sale has been made, or after learning that the customer has purchased from some other firm, then it is necessary to design your cards and filing method with this in view. This system would no doubt be applicable to manufacturing concerns manufacturing machine tools, boilers, engines, etc. If the business be a wholesale business, where it is requisite to keep "everlastingly after your customer," then this should be taken into consideration in outlining the system. There has also been much said as to the point as to how soon you should write a prospective customer after receiving the first inquiry. This is a very critical point in the "follow up" system. The class of the customers has much to do in determining this matter, also the character of the business. It may be that one customer you could write a "call up" letter in ten days after receipt of the first inquiry, while with another customer to push the matter so fast would injure the sale of your goods. Therefore, it not only becomes necessary for the correspondent in charge of the follow up system to be able to answer inquiries in a business-like manner, but he must also study the

FIG. 8.—FEEDER CARD FOR FIGS. 5 AND 6.

character of his customers from the inquiries received and determine from them the method of handling after first letter has been answered.

It has been the custom of business houses using the follow up system to send out numerous circular letters at different intervals after receipt of the first inquiry, and while this method may bring results in some cases, yet the circular letter has been used too extensively and considerable money has been spent in this way to no avail. Not that I mean by this that it should not be used at all, but I think better results will be received by writing

special typewritten letters to "call up," and occasionally send out circular letters. Some may argue that special typewritten letters cost too much and that more money will be spent in preparing them than is gained, yet these people, I venture to say, will spend more money in sending out circular letters of no account than they would spend in only sending out half the number of special typewritten letters with good results.

In giving a description of the system which I have outlined, will say that I have designed three cards, as shown in Figs. 5, 6, 7 and 8, the card shown in Fig. 6 being the back of card seen in Fig. 5. The card in Fig. 5

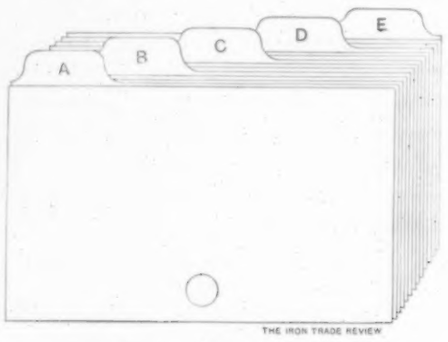


FIG. 9.—INDEX CARDS.

is the main card and should be filed in alphabetical guides. See Fig. 9. This card will give the entire dealings, in brief, with a customer for several months, possibly a year, and can be made continuous by simply filling out another card, when all space has been used on the first one, and so on, numbering your cards 1, 2, 3, etc. In connection with this main card, Figs. 5 and 6, we will use two sub-cards which are shown in Figs. 7 and 8. The card in Fig. 7 should be filed in geographical guides, see Fig. 10, and you can file either by States or towns. I would suggest filing under States alone, unless by so doing the cards filed under different states would become voluminous and be too hard to refer to. In that case, use States as main guides and town guides as sub-guides under the States. The object of the card shown in Fig. 7 is this: It very often is necessary to pick out a list of customers in different States and various large cities in different States. If you had but the one card, that is Fig. 5, the only way to get this list would be to run over all the cards in the alphabetical index. However, by using this card shown in Fig. 7 it will be found that you could

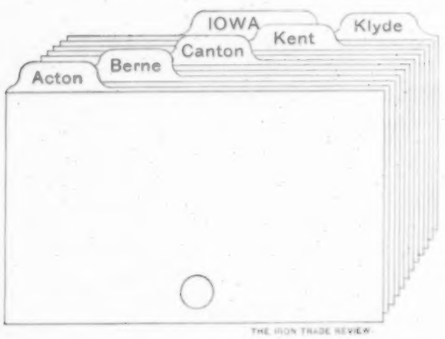


FIG. 10.—CARDS SHOWN IN FIG. 7 FILED WITH GEOGRAPHICAL GUIDES.

have cards for such a list in almost an instant. Another advantage is this: You wish to write to a customer, you know where he resides, but you cannot recall his name. In this event, turn to your State guides, run over the cards under this State, or if you sub-divide with towns under States, turn to the town and it will only be a moment's work to find him. Anyone with any experience in looking over correspondence, hunting for the name of such a customer, will realize at once the advantages of this system.

The next is the card shown in Fig. 8. This card is what I call a feeder for Fig. 5, and makes that card continuous. It should be filed under chronological guides, monthly and daily. See Fig. 11. To illustrate, we will suppose you receive an inquiry from a prospective customer (the feature would also hold good for an old customer), you answer his inquiry, make quotation, send out literature, perhaps; you then fill out card in Fig. 5 in proper form, and file in alphabetical guides; at the same time you make out a card as shown in Fig. 7, also Fig. 8. In the follow up system, the card shown in Fig. 8 will be found to be the one continuously used, and in filling out this card you can see that all that is necessary is to write the name and address of the customer, and then, down under the sections ruled for "Call up," write the date of answering inquiry; as an example, say we use date Jan. 11, 1904. Then in filing this card in chronological guides, file it say ten or fifteeen days ahead of the day inquiry was answered; if ten days and inquiry answered on the 11th of January, you would file under the 21st; or if fifteen days you would file under the 26th. When the ten or fifteen days are up your card would come up for attention and then it could be handed to the stenographer to look up correspondence to see if anything had been received from the party since receiving his inquiry. If not, the card should be returned to the correspondent's desk and he could dictate a second letter, send out additional literature or circular letter, such as he would decide upon as being the most advisable. Then when this second letter, literature or circular letter had been sent out, the stenographer could take out of the alphabetical guide the card (Fig. 5) of this particular customer and make proper entry and then replace it, also file card (Fig. 8) ahead another

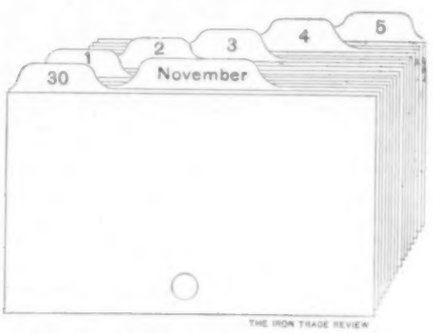


FIG. 11.—MONTHLY AND DAILY GUIDE CARDS.

ten or fifteen days. In this way you will see that you will have an endless chain follow up system.

The great advantage of keeping the card shown in Fig. 5 is, that you have the entire dealings with any one customer for a certain length of time, and you can tell at a glance at this card just what price was quoted at any particular time without looking at correspondence and can also see just what orders were received without referring to the order book.

In conclusion I would suggest that some distinctive color be used for each card, say card Fig. 5, blue; card Fig. 7, salmon or buff; and card Fig. 8, white. This would avoid any mistake being made of filing them in the wrong file. Another thing, if the vertical system of filing correspondence is used, filing by numbers, it would be a good idea to have correspondent's file number appear on card Fig. 8 in upper right hand corner, to aid the stenographer in looking up correspondence.

The regular monthly meeting of the Engineers' Society of Western Pennsylvania was held at Pittsburg on Tuesday, Jan. 19. Dr. C. W. Waldner read a paper on "High Temperature Measurements." The lecture was illustrated. Among the new members elected was Arthur A. Hamerschlag, newly elected director of the Carnegie Technical Institute.

The American Locomotive Co. has received an order for 80 locomotives from the New York Central. It is understood that a contract will be signed soon with the Lake Shore for a number of locomotives. The total order is expected to amount to 112 locomotives or more.

THE MAKING OF A SUB-DIE AND PUNCH.

BY F. B. BURNHAM.

In the Dec. 3 issue of *The Iron Trade Review* the most approved method of making a sub-die was explained, but with all due courtesy to Mr. Woodworth the article was wanting in some respects. If the method were used on watch work (to which he makes reference) much difficulty would undoubtedly be encountered.

The article referred to did not describe the method of making the die and punch, but assumed that the punch would of necessity have to be sheared, which on wheel work would be very objectionable, to say the least, owing to the fact that all the punches are milled to size, and the spoke-wheel punches are ground and lapped inside the rim, which fact would not permit any shearing to fit the punch to the die. The method referred to would work on irregular shapes where the dies and punches are filed to fit, but where they are machined entirely the method would not apply, so I submit the following method of making sub-dies which has proven very successful.

The frame A is faced on the bottom and bored to fit a special face plate having a boss on it of the desired size, the frame is then fastened to the face plate and bored ½-inch taper to the foot, and with the same setting (after locking the back gears) four grooves are splined lengthwise within the barrel to hold the babbitt from turning.

The frame is now put on an arbor which fits the taper just splined, and the barrel is turned and a thread cut at R to which the ring C is afterwards fitted. The bottom of the frame is again faced and bored, while on the arbor to insure perfect alignment with the inside of barrel.

The ring C is then bored through about .005-inch smaller than the desired finished size of the plunger, recessed and a thread cut to fit the barrel. A ring (used for construction only) is now made about ⅛-inch thick to fit within the ring C, the inside diameter being ⅛-inch smaller than the bore barrel at D. The ring C is now screwed on the barrel against the small ring within the bored true to the required size of the plunger.

The base B is planed and screwed to the face plate, faced true, the boss turned to fit the bottom of frame, and the center recessed for the base of punch I. The plunger E is then centered, held in a steady rest and bored to accommodate the shedder spring P and a thread cut for the tension nut L and button F. The button (of machinery steel) is then screwed into the plunger against the shoulder, and the plunger is roughed down in a lathe and then ground to size on centers, leaving it with a highly polished surface which should not be touched with an emery stick.

The punch plate G is made by holding a piece of stock in a chuck, turning and facing a boss on the end of the right size, and (before cutting off) roughing down another boss on the opposite side from the finished one. The plunger is again put in a lathe, supported by a steady rest and recessed to receive the boss on the punch plate just made, which is rapped in against the shoulder, and, driven by the plunger, the unfinished boss is turned to fit the back of the die, which, in place runs absolutely true. Three grooves are now milled lengthwise on the plunger to prevent it from turning in the babbitt.

The base B is drilled, tapped and counterbored for the stripper springs and screws, also drilled for dowels and counterbored for the screws to secure the base and frame. The base, frame and plunger are now completed.

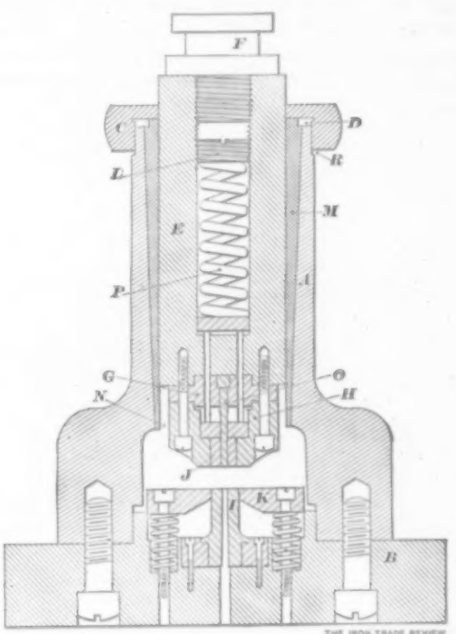
The die H is made by holding the stock in a chuck and with steady rest is turned and recessed to acommodate the shedder base J, and boss on punch plate G, then drilled and bored the size of the root of the teeth on the sample wheel, the die is now cut off and held in spring chuck and the front is faced true with the back.

The broaches are made with either three or four steps (according to size of die) increasing from .0015 to .0025-inch to each step, and the teeth milled (great care being taken that the cutter is milling exactly central and straight). The broaches are hardened and drawn and the blank die is broached (much care again being required). After the die has been drilled for screws and dowels it is packed in bone-dust and carefully heated, then immersed in oil, and drawn to light straw color. The bottom of the die is next ground and lapped.

The punch I and shedder J are then milled (the miller not having been disturbed) to fit the die, then drilled on centers (using steady rest) to the size of the center hole in sample wheel, the hole in the punch is reamed from the back ½-inch taper for clearance and the hole in the shedder is left straight.

A base is made for the punch I which fits tightly into the base proper where it is held by screws and dowels, also one for the shedder J which works freely within the recess in the back of the die. The object of putting the shedder into a base is to allow the milling cutter to traverse its entire length when being milled and forms a square shoulder for it to strike against when it sheds the blank. The punch is next set in position in the base and screwed down tightly, and slightly ground on a surface grinder to give a perfectly square top.

The die, shedder and punch plate are assembled, being screwed and doweled to the plunger, the tension nut is so adjusted as to allow the shedder to come within 1-16-inch of the face of the die. The frame is put into position on the base, the screws tightened, and after the plunger has been lightly wiped with an oily cloth and sprinkled with flake graphite, it is carefully let down through the frame and the punch I allowed to enter the die until it is checked by the shedder. The ring C is now screwed down (the small ring being within) which brings the punch, die and plunger exactly in line, and central within the frame.



THE MAKING OF A SUB-DIE AND PUNCH.

The frame is inverted upon a level and rigid bench (free from vibration), slightly warmed with a Bunson burner and poured with babbitt M from two sides simultaneously, and allowed to cool. The plunger is afterwards withdrawn, the base and frame separated and the babbitt turned out at N (where it overflowed in pouring), allowing a further downward motion to the plunger.

The frame and base are again assembled (the small ring within the ring C taken out) and the plunger driven down and a blank cut from brass stock about .010-inch thick. After the plunger is withdrawn the die and punch are carefully examined to ascertain if there is even the slightest shearing (if any occurs the frame must be re-babbitted), but if care and exactness have been exercised in the making of the frame and base, also in proper temperature of the babbitt, the die will invariably "line up." The punch plate G is now drilled and counterbored for the piercing punch O, which is turned to fit within the shedder J, and the punch I, the former supporting and strengthening it when the die is in operation as well as shedding the blank.

The lower stripper K is made, being broached similar to the die, drilled for screws and pins for grinding the stock, then hardened and ground. For a general line of watch work eight springs under the stripper are required to strip the stock. The stripper is properly adjusted in the base, allowing it to stand .005-inch above the face of the punch, the frame screwed into position on the base, proper tension brought upon the shedder spring P and the sub-die is ready for its work.

A PLANER FOUNDATION.

BY OSCAR E. PERRIGO.

With the constantly increasing demand for a much finer grade of work in all mechanical establishments; for more accurate fitting; for standard sizes; for practically perfect circular work where the circle is involved; for work that is to be square, to be at absolutely right angles; and for straight work to be as nearly absolutely straight as it is possible to make it; with the demand for machine tools of such construction and accuracy as was not thought necessary or hardly possible in the average machine shop of a dozen years ago—many of the standard machine tools, such as lathes, shapers, millers and planers, have attained a degree of precision that seemingly leaves little to be desired in this direction. That these tools are expensive to build as well as to buy, is one of the necessities imposed by this demand for accuracy. And it is met fairly, and the price is paid by all up-to-date establishments making even a pretense to producing reasonably accurate work.

Let us consider for a moment the application of this condition of demand and its successful supply in the case of a planer. It is certainly commendable, and shows a progressive spirit on the part of the management, to purchase the best and most accurately built planer in the market, as well as the one that will produce the greatest quantity of work—good work—work that one may "swear *by*" instead of swearing *at*. But, having purchased the best planer the market affords, all conditions being equal, it becomes an important question as to the best method of setting it up so as to give the best results. Right here be it said that however much is paid for a planer, or however good may be the reputation of the establishment from which it is purchased, the machine will not do good work unless it is properly set up; unless it has a properly built foundation upon which it may be supported. And as a good price has been paid for a good machine, we must not expect a good foundation at a cheap price. Good things cost money.

Of the failures of foundations of the "good enough" kind many of us know all we need. It is the object of this article to describe and illustrate a foundation that will properly fulfill all the requirements and conditions of the case. First, it may be well to call attention to some of the vital points of the matter.

It is best to have all planers on the ground floor. Small ones with extra heavy beds may be placed on an upper floor, but certainly those for work over four feet long should be placed on the ground floor.

All planers thirty inches square and ten feet long, and over, should be set on special foundations.

All excavations for foundations should be carried down to "hard pan," or perfectly reliable, hard gravel bed, whether it be found three feet down, or ten feet.

All piers should be begun with quite large stone, laid as a wide footing, to the depth of from twelve to twenty-four inches, according to the depth of the foundation.

All foundations should be laid in strong cement mortar, by which is meant that containing two parts portland cement, one part lime, and about three parts of clean, sharp sand. The amount of sand will vary considerably with its fineness, sharpness and freedom from dirt. The finer the sand, the greater the quantity necessary. The spaces between the piers and between the walls and the surrounding earth should be tightly rammed with hard gravel, if it can be had. It will be well to use a hose and plenty of water in "puddling" this gravel in as closely as possible, as much support may thus be given to the masonry.

In the engraving, a foundation is shown for a planer 48 x 48 inches x 18 feet. Fig. 1 is a vertical, longitudinal section of the foundation, and Fig. 2 is a plan. Substantial ground is supposed to have been found at a depth of five feet, and upon this the stone footings for the piers are laid, two and a half times the width of the stone cap, and a proportionate increase in the length of the piers. This stone footing is laid two feet deep, and upon it the brick piers are built with a "batter" of two inches to the foot. In laying these bricks each course should be completed separately, and not by building a shell of one width of brick around the outside for several courses up at a time and filling in with brick bats and wide joints. In raising the corners not over three courses are built up, as cement mortar sets rapidly and it is very important that the work should be bound together as closely as possible. Flush joints should be insisted on in all machine foundation work. All piers are capped with stone of fairly even thickness and level on the upper side.

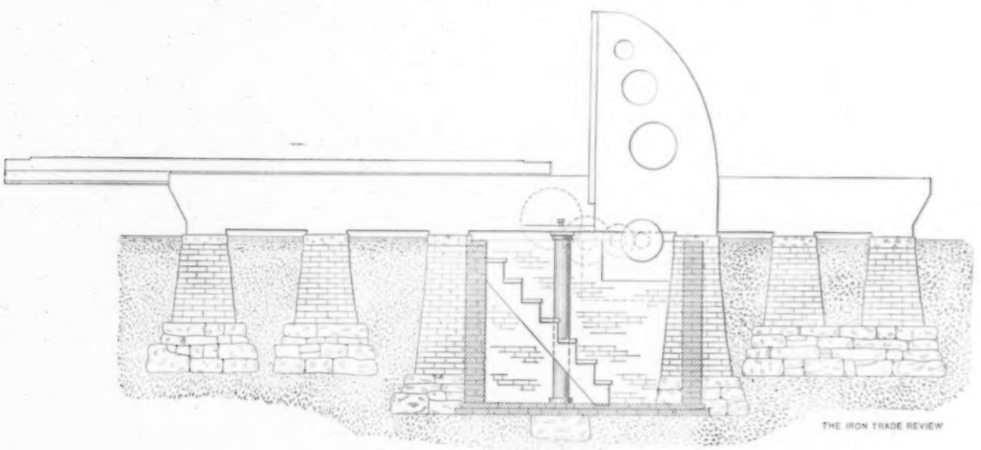


FIG. 1.—VERTICAL, LONGITUDINAL SECTION OF PLANER FOUNDATION.

In the center a pit is built as shown in the engraving. It should be six feet deep and extend from the pier beneath the rear of the side posts or housings, to a point far enough in front of the center gear to admit of free access to it in case of needed repairs. This pit should be wide enough to admit of placing in it wooden removable steps as shown. On each side of the planer, pockets should be built for the pulleys, in case the planer is supplied with pulleys extending below the floor line. Thse pockets should be of such size as to permit the pulleys to be slipped on and off the end of the shaft, and at least twelve inches wider than the diameter of the pulleys. In this case they are shown for a planer having pulleys on both sides.

As nearly in a vertical line with the cutting tool as may be, are two hollow columns, usually made of heavy cast iron pipe, resting upon the brick floor of the pit, reinforced at these points by a large, well set stone. These columns support the planer bed at the two points, the weight being taken by heavy adjusting screws and a sole plate as shown.

A foundation of this kind should stand from five to ten days, according to its depth, after it is built, before the planer is placed upon it, in order that all mortar joints

may be thoroughly set and perfectly hard and firm. The planer may be leveled up by steel wedges, lifting it about one-quarter of an inch from the stone cans. The space around the resting places of the bed may then be closed with putty and melted lead poured in to give it a solid bed on which to rest, after which the steel wedges may be removed, leaving the weight upon the lead only. Melted brimstone is sometimes used, but its liability to crack from sudden jars renders it inferior to lead for this purpose.

In leveling up a planer, it is frequently the practice to level across the flat surfaces each side of the V's, or, if the table has been planed off when the planer was prepared for inspection in the shops, to place the level on that. The best plan, however, is to level up the bed before the table is put on. To do this properly, turn up three round pieces of steel whose diameter is such that as they lay in the V's of the bed they will project a half inch above its sides, and of a length equal to twice their diameter. These should be accurately ground to exactly the same diameter. (They may be made all in one piece and afterwards cut up if preferred.) Place them in the shaper and plane a flat place one-half to three-quarters of an inch wide on one side of each of them and be sure that they caliper exactly the same across from the round surface to the flat space. Place one of these in each V, at one end of the bed with the flat surface up. Lay on the parallel straight-edge and then the level, and bring the bed up to it. The third piece is then placed in one of the V's, the length of the straight-edge away from one of these

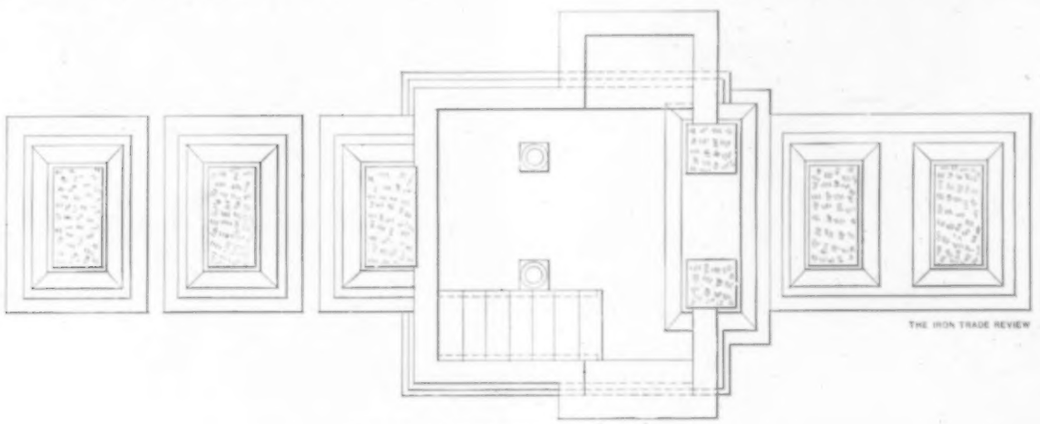


FIG. 2.—PLAN OF PLANER FOUNDATION.

already located. Now, level lengthwise. Transfer one of the other pieces to the V, opposite the last one located and level crosswise again. Then from the last two level lengthwise, and so on the entire length of the bed. It may be necessary to go over the bed several times, never less than three times, but by this means a long bed may be leveled correctly and "out of wind." The time spent in accurately leveling up and setting a planer bed will be well spent when it comes to doing accurate work, and so saving many dollars in the usual expense of scraping work to fit on account of poor planing.

To have a planer so set up as to do really first-class work will save from 40 to 60 percent of the usual scraping expenses, due to even fair work, besides the satisfaction of having a machine whose work can be depended upon. The testing of the planer is very interesting but the limit of this article will not permit of its introduction here.

The board of governors of the New York Stock Exchange decided on Jan. 27 to strike from the list dealt in upon the exchange the common and preferred stocks of the American Steel Foundries. President Thomas declined to give any reason for the action. The American Steel Foundries was incorporated under the laws of New Jersey in January, 1902, and is a merger of the Sargent company, Chicago; the Franklin Steel Casting Co., Franklin, Pa.; the American Steel Foundry Co., the Reliance Steel Casting Co., Pittsburg, and the Leighton & Howard Steel Co., St. Louis. A majority of stock of the American Steel Casting Co., of New Jersey, was later acquired. Joseph E. Schwab, brother of Charles M. Schwab, is president. Among the directors are S. R. Callaway, E. B. Thomas, Lewis Nixon, Max Pam, W. C. Brown and Charles M. Schwab. The company has outstanding $15,000,000 par of common stock and $15,500,000 preferred.

Pressed Steel Car Co.

The Press Steel Car Co. has declared a quarterly dividend of 1¾ percent on its preferred stock and the usual dividend of 1 percent on its common stock, both payable on Feb. 29. The following report for the year ended Dec. 31 last, with comparisons for 1902 and 1901, was presented at the meeting:

	1903.	1902.	1901.
Net Earnings	$2,768,898	$4,578,114	$1,984,062
Depreciation	260,000	300,000	199,793
Balance	$2,508,898	$4,278,114	$1,784,269
Pref. dividend	875,000	875,000	875,000
Balance	$1,633,898	$3,403,114	$909,269
Common dividend	625,000	500,000	500,000
Surplus	$1,008,898	$2,903,114	$409,269

The action of the directors in regard to dividends is a reduction only in that the extra 1 percent paid last year is dropped. The common stock paid 5 per cent last year, the extra 1 percent being added in quarterly instalments. The statement of the corporation for the year 1903 reflects a falling off in the demand for material that enters into railroad construction. In view of the retrenchment policy adopted by the railroad companies the statement of the Pressed Steel Car Co. is considered by many as favorable. The corporation is the largest consumer of steel plates in the country. The annual meeting of the stockholders will be held on Feb. 17 to elect three directors for the term of three years, to succeed the three directors whose term of office will expire on that date.

At the annual meeting of the American Tool Works Co. Cincinnati, held last week, the following directors were elected: Franklin Alter, H. H. Peck, R. J. Smith, J. B. Jones and A. B. Voorheis. J. B. Jones takes the place on the board of L. E. Voorheis, son of A. B. Voorheis. The directors organized by electing the old officers, who are: President, Franklin Alter; vice president and general manager, J. B. Jones; secretary and treasurer, Harry Lewis. The company had a prosperous year.

M. C. Callaway, of Macon, Ga., has been appointed receiver of the Georgia Car & Mfg. Co., of Savannah, Ga. In making the appointment Judge Emory Speer, of the United States Court, said that he was obliged to take the action because both the bank and the owners of the car works asked for it, but he hoped that the plant could be kept going and escape from its embarrassment. The property is valued at $300,000.

A GEARED DIE STOCK.

The geared die stock manufactured by the Borden Co., of Warren, O., has a solid die held in the socket in front of the machine as seen in Fig. 1, the pipe is run through the back of the machine right up to the die where it is self-centering. Then the hand wheel is turned and the vise jaws closed to hold the pipe and the crank turned until the thread is cut. The company prefers a solid die to any form of adjustable device with movable chasers working in holes in a shell and operated by inclined grooves or cams in which the dies are slid into place and set to the changing gauge marks on a face plate. The solid dies are all made with special tools and finished in a patented geared hobbing block and carefully tempered. The dies are made slightly off center to give a shearing cut, every chaser being set to the proper pitch, and can be ground off when they become dull, without drawing the temper and used over again. They are claimed to cut full and standard threads until worn past the center and then the ide block may be returned to the makers for the insertion of new chasers or segments.

The construction of the machine is best shown in Fig. 2. The feed screws is indicated by A, and B is a ring frame and overhanging arm containing the driving pinion C in mesh with the large gear wheel D. The extension arms are designated by E, each supports a threaded bronze feed block F which acts

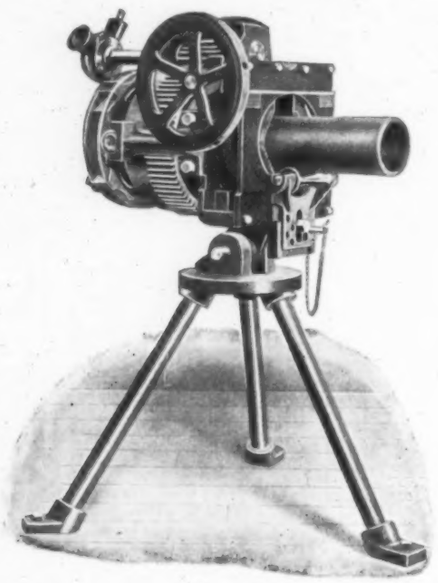


FIG. 1.—FRONT VIEW OF BORDEN DIE STOCK.

in conjunction with the thread of the feed screw. The enlarged front portion G is the die socket in which the solid die block is held and rotated by the gear. A hinged plate H holds the die in place and I is the hand wheel operating the double jawed pipe chuck. The universal pipe chuck is shown at J, K is the driving shaft, L the ratchet and M is the pipe roller rest and gauge.

In practice the pipe is inserted through the inner tubular portion of the machine until the forward end enters into the die block and then the chuck is tightly closed to hold the pipe in place. The pinion C is rotated by a ratchet or crank applied on the shaft K and turning the gear wheel D. The pinion C being longer than the width of the gear wheel D, the latter moves lengthwise as it works on the feed screw A and at the same time slides on the smooth exterior of the round portion of the machine. This turns the die in the socket G and cuts a thread on the pipe corresponding to the pitch of the coacting threads of the feed screw A and the bronze feed blocks F.

The machine is regularly mounted on a tripod stand but the stock and flanged base may be removed and bolted to a work bench, the head also is detachable and can be put into service separately. It is made in a number of sizes.

The Pennsylvania Steel Co. has obtained the contract for material for the Turkish Hedjaz railway.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Feb. 2.

Reports from manufacturers are somewhat conflicting concerning business in the first month of the new year. Those who are willing to be quoted take an optimistic view, but others are not so hopeful. For example, the president of one company says:

"During the last month or two, we have had a decided falling off and at the present time more than 60 percent of our men are out of work and the future does not look very promising as regards their returning to work. We probably have more customers than we had two months ago, but the trouble is that the customers, one and all, are doing very little. We hope for better conditions in the near future, but, on account of the Presidential situation, fear that we shall be disappointed."

In contrast with this expression, the Ajax Mfg. Co. says:

"We are exceedingly pleased with the business outlook of the coming year. We have received more orders this month

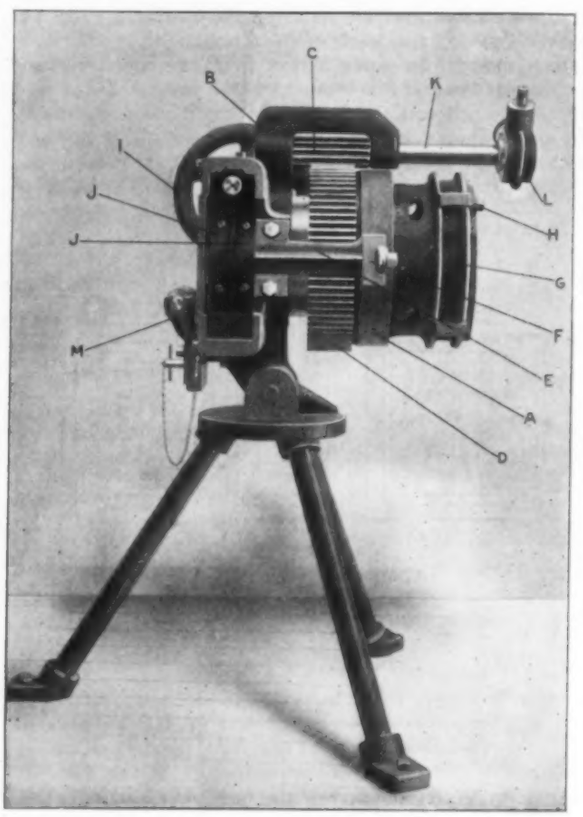


FIG. 2.—SIDE VIEW OF DIE STOCK.

than in the same month last year and the prospects for future business are very fine."

The Garry Iron & Steel Co. reports that the business for January has not been as large as it might wish, but it feels very much encouraged as it is receiving a great many inquiries for new work, and believes that before another thirty days have passed, there will be a marked improvement in the general conditions.

The Standard Welding Co. states that business with it during the month of January has been very satisfactory, and from the evidence of sales of automobiles at the New York Show, which undoubtedly is a forerunner of what will follow at Chicago, Philadelphia, Boston, Buffalo, Detroit and Cleveland, it believes it will on this line of goods enjoy a busy season up to July next. The demand for mechanical tubing, and the welding by electricity of mechanical propositions, is beyond expectations. The company believes that its special process of welding enables it to feel the general pulse of business more thoroughly than perhaps any line of business except in drills and small tools, and if it properly interprets the throb

of the pulse of business, it is slightly on the increase, and will remain satisfactory.

The National-Acme Mfg. Co. reports that business for January has been quite satisfactory. It has taken on some nice orders within the past ten days and has likewise been getting inquiries recently that promise well for an additional lot soon. It believes that the tone of the market is more encouraging than it has been for sixty days past. The foreign field for this company is having the personal attention of W. S. Chase, sales manager, who contemplates spending about two months abroad, solely on business.

The Cleveland Punch & Shear Works Co. states that business has been rather quiet during the past month, as buyers seem to be holding off with their orders for machinery in its line. Inquiries have been brisk, however, and the company looks forward to considerable business during February. It believes it would be well for prospective buyers of machinery to place their orders at this time, as they will get a much better price and quicker delivery than they will if they postpone ordering until later. The company's officers are by no means pessimistic as to the outlook for the year, but believe that it will round up some very prosperous business.

The Avery Stamping Co. is strictly in the pressed steel and forging line, in which it has had very liberal business during January, and looks for an increased trade from now on.

The Cleveland Elevator Bucket Co. is hopeful that its business will be good for the year, although the opening of the year does not come up to last year's average.

The Cleveland Twist Drill Co. writes: "During the months of December and early part of January there was the usual trouble experienced in this line of business with the buyers of the various jobbing houses, who always make a determined effort during December and January to beat down prices for the coming year, but so far their efforts have been without results as the price of twist drills is and has been for the last two or three years as low as the manufacturers feel they can sell their product for. There seems to be a fair volume of business going now, and we cannot see why there should not be a good demand during the coming year."

The Vulcanus Forging Co.'s product is confined strictly to rivets and air brake pins. While orders are not numerous, inquiries for prices are beginning to come in, and the company anticipates some improvement in the market in the near future.

The Kirk-Latty Mfg. Co. reports that so far as it is concerned, the year has started out favorably. While there is not the volume of business that there was this time a year ago, the company nevertheless feels that, all things taken into consideration, it has no particular reason to complain.

The Cleveland Pneumatic Tool Co. writes: "The first month of the new year has been very satisfactory to us in business when we take into consideration the condition of all lines connected with the steel and iron interests of this country. Inquiries about tools and prices have been good, and indicate for the near future a nice trade. We are pleased that organized labor is meeting the situation of the business of the country in as good spirit as it is. It would seem to us that all differences can be adjusted, and that 1904 should be another prosperous year."

The Tennessee Coal, Iron & Railroad Co. has received an order from the United States Government for 100 tons of No. 1 soft foundry iron to be shipped at once to the Navy Yard in Washington. This is the first order from the Government that has got into the Birmingham district for some time.

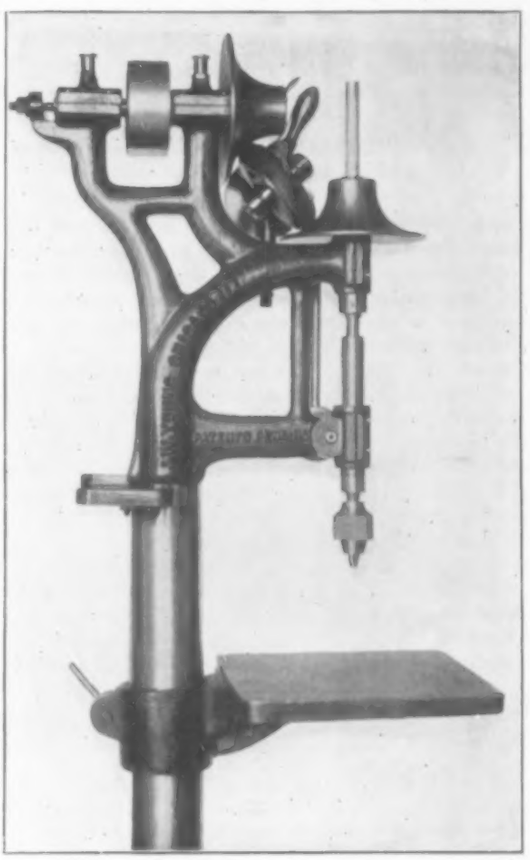
The creditors of the Torrance Iron Co., Troy, N. Y., held a meeting a few days ago to receive the report of the receiver, Clarance E. Betts, and authorized him to apply to the Supreme Court for an order to sell the plant. Meantime, operations are to be continued under the management of the receiver.

On application of the Metropolitan Trust & Savings bank and with the consent of the president of the company, Octave Jacqmain has been appointed receiver for the Matthews Steel Casting Co., Matthews, Ind.

THE BOYD SENSITIVE DRILL.

By the Boyd sensitive drill are secured the higher speeds so necessary in small drilling. The spindle is driven by a friction wheel connecting two concaved cones, one of which is driven by the belt and transmits its motion to the spindle cone. These cones are so placed that when the friction wheel is on the large diameter of the driving cone, it is on the small diameter of the driven cone; and when on the small diameter of the driving cone, it is on the large diameter of the driven cone. These positions are obtained by the controlling lever at the right of the friction wheel.

The range of speed is 9 to 1, allowing a variation from 500 to 4,500 revolutions per minute. These changes are obtained without shifting any belt, and the same lever which controls these speeds also serves to stop the drill by simply turning it out of contact. No countershaft with troublesome possibilities in loose pulleys is required and the machine is driven direct from the main line, or from a jack shaft. The range of this drill is from ¼-inch to 0 and will drill to the center of a 10-inch circle. Greatest distance from end of chuck to table



THE BOYD SENSITIVE DRILL.

in bench drill is 12 inches, and in floor drill from end of chuck to floor is 3 feet. The table is 8 x 10 inches and can be swung around the column out of the way. The manufacturer is J. W. Young, of Chicago.

The Ohio Tube Co., recently incorporated under the laws of New Jersey, was formed for the purpose of taking over the plant at Zanesville, O., of the Eastern Tube Co., under a plan for the reorganization of the corporation. The attorney of the new company is Joseph H. Beall, 26 Broadway, N. Y.

Babcock & Wilcox boilers are to be installed in the Brighton, south of England, municipal electrical plant. The contract is valued at upwards of $140,000.

The United States Cast Iron Pipe & Foundry Co. has declared the regular quarterly dividend of 1 percent on preferred stock.

PRICE LIST AND DISCOUNTS.

BY KENNETH FALCONER.

The use of a priced catalogue in which the prices shown do not even approximately represent the actual selling price of the goods represented, but are subject to one or several discounts, is very generally regarded as the best practice by those concerned with the selling of staple or regular lines of product. In such cases it is usual to furnish customers from time to time with lists showing the discounts current on the various articles or lines of merchandise; and, when either the material or labor market is exceptionally uncertain, to cancel these

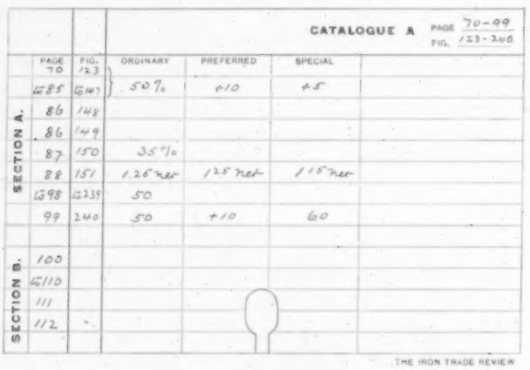


FIG. 1.—DISCOUNT LIST.

and quote discounts on application. To keep accurate record of such quotations is a matter of some importance, but is very frequently neglected because of the large number of entries which are necessitated if each entry is noted separately, and from failure to carefully devise a proper system for taking care of such quotations with a minimum expenditure of time and labor. The following plan was devised after an attempt to put on record all quotations during a six weeks' sickness of an exceptionally competent quotation clerk. It was the outcome of the proven necessity of having records of the various discounts allowed different customers on the different lines shown in the catalogue, instead of depending upon the personal knowledge or memory of any individual employe.

The base of the system is a two-drawer cabinet of 6 x 4-inch cards; one known as the "Discount List," the other as the "Class Index." The discount list, of which Fig. I shows a specimen, to facilitate reference is divided by numerical guides numbered 10, 20, 30, etc. The actual division, however, is into sections or classes of product on identically the same

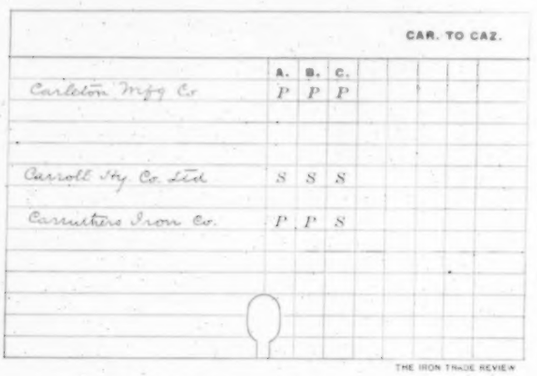


FIG. 2.—CLASS INDEX.

lines, and in the same rotation, as shown in the catalogue. The class index is subdivided by alphabetical guides, 80 to the alphabet having proved very satisfactory. Under some circumstances it might be best to have a card index for each customer—but in the present case several names are on each card.

The articles as illustrated in the catalogue are naturally so arranged as to be classified in the sections known respectively as "A," "B," "C." For purposes of illustration we will assume that each section or class of goods takes up 100 pages of the catalogue.

Previous to the adoption of the plan customers were notified that on a certain date all discounts were to be considered withdrawn, and new quotations could be had on application. The various discounts given different customers are known as "Ordinary," "Preferred," and "Special." The terms explain themselves.

The cards for the discount list having been made out, the first step was to note these different discounts opposite the number of those goods or articles in most frequent demand, discounts applicable to lines less frequently called for being left to a more convenient season. Reference to the illustration given, Fig. I, shows that it has not been found necessary to leave a line for each article represented in the catalogue, as in many cases the same discounts apply not only to many illustrations but to many pages. Where the "Preferred" or "Special" discount is entered as plus a certain percentage, it means that percentage is in addition to the discounts quoted in the column or columns preceding.

Whenever a quotation is made to a customer a card in the class index was headed with the name and placed in its correct alphabetical position. The quotation given is indicated in the proper column by the insertion of the first letter of the three classes mentioned, "O," "P" or "S." When the current discount on any article is changed it is altered on the discount list. Examination of the column headed for that class of goods on the class index cards, shows at a glance the customers who have been quoted on such goods, and whom it may be advisable to notify of the change. It may be mentioned that discount lists on special lines sent occasionally to certain customers are entered up exactly as though they were quotations asked for and given.

Not only has this plan been found to work for accuracy in the quoting of prices, but it is a time-saver instead of a time-loser as might be thought. The cabinet is kept close to the telephone and, using the two forms here given as an illustration, should the Carleton Mfg. Co. call up and ask for the discount on Fig. 240, page 99, anyone in the office can turn up the number in the discount list and, seeing that the article referred to belongs to class or section A, look up the inquirer's name in the class index, and finding that on such goods he is on the "Preferred" list, 50 and 10 percent off list price is immediately quoted. If the article inquired for was in section C, a straight 60 percent would be the discount given. This plan has been in effect for a year or more, and the quotations given have been conscientiously put on record during that period. A new hand can at any time take hold of the quotation desk with but little inconvenience, and a minimum chance either of losing orders by quoting too low a discount or of giving a larger discount than the customer is properly entitled to for the different lines of goods handled.

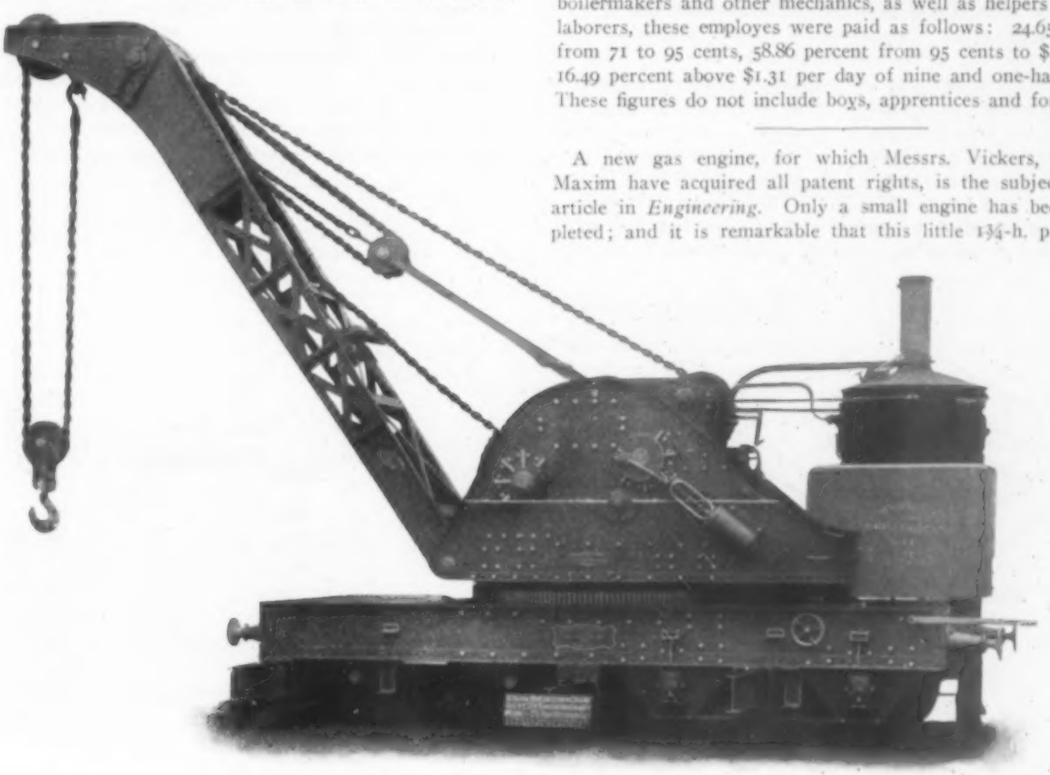
Negotiations which have been in progress for some time between the Chamber of Commerce of Charleston, W. Va., and the Kelley Axe Mfg. Co. of Alexandria, Ind., have resulted in the company deciding to move to Charleston. The concern will, however, be operated by its present owners. The business was started in Louisville nearly 30 years ago, and from a small concern grew until gas was found in the Indiana belt, when by a liberal bonus it was brought to Alexandria and a new plant was erected. Three years ago the plant was nearly destroyed by fire. The question of locating elsewhere came up, and rather than let it go the citizens of Alexandria raised a $4,000 bonus. The plant was then rebuilt. Fuel troubles then began through the failure of natural gas and experiments were made to supplant gas with oil. Later coal was added and the three fuels were used. It is said that this made the fuel bill so high that the plant could not be operated as profitably as formerly. The plant employs 500 men. It makes 10,000 axes daily and 200 dozen scythes and cradles.

At the Jeffersonville (Ind.) plant of the American Car & Foundry Co., work has begun on 63 coaches for the Missouri, Kansas & Texas railway and 40 for the Frisco system. The passenger department is very busy, but the freight shops have few orders on hand. The new scale of wages providing for reductions of from 10 percent to 30 percent was effective Feb. 1.

A YARD CRANE FOR HEAVY LOADS.

A remarkable crane has just been completed at Carlisle, Eng., by Messrs. Cowans, Sheldon & Co. It is nominally of 20 tons capacity but is capable of a liberal overload beyond this point. The machine is mounted on eight wheels and two pairs are required for the buggy truck. Limit nuts are fixed above the springs in order to adjust the pressure on these at the moment of raising the load, as well as to maintain the level of the platform when the crane operates on a curve or a declivity. The wheels are suitable for running on the regulation railroad track. Four of the wheels are equipped with screw brakes operated from the platform of the crane.

The crane manipulation, hoisting, lowering, adjustment of the jib and slewing, are performed by steam. The boiler has a diameter of 4 feet 9 inches and a height of 6 feet 7 inches. The two cylinders of the engine have each a diameter of 8 inches and the stroke is 14 inches. The drum is made of cast steel and has friction brake with wooden shoes. The crane is built of structural steel and the top and bottom are made with full plates. The chains for operating the boom and lifting loads are respectively 1⅛-inch and 131 feet long and 1¼-inch and 78 feet long. The crane is provided with tongs and bars in addition to the screws already mentioned for maintaining the stability of the machine in action and has a radius of action over a circle of 22 feet. The average power is given as 20 tons but the crane has raised 5 tons over this limit and the manufacturers have in course of design a crane which will be built with this weight as the ordinary load.



A 20-TON YARD CRANE.

The Fay & Bowen Engine Co. has decided to move from Auburn, N. Y., to Geneva, N. Y., because the boat end of its business has outgrown its facilities and Auburn is not an ideal place for the manufacture of boats. If its trade were confined to engines alone, the company would stay in that city, but it finds its boat trade increasing so rapidly that it is obliged to seek a location where the two branches of the business can be advantageously combined. The company has purchased property in Geneva fronting on both lake and canal. The site was already equipped with a good building erected within the past twelve months especially for boat work and the company has already broken ground for a machine shop. With its canal, lake, and rail facilities the company considers that it will have the best location for this business of any concern excepting possibly two or three of those on tidewater near New York.

Wages in Germany.

A report on wages and the cost of living at Mannheim, Germany, has been made by United States Consul Harris. He says that of 100 blacksmiths employed in one of the plants of a company manufacturing agricultural implements and traction engines last year 31.79 percent of the 100 received per day of 9½ hours, 71 to 95 cents, 45.05 percent 95 cents to $1.31, and 23.16 percent more than $1.19. These figures do not include boys, apprentices or foremen. Of the 121 blacksmiths employed at another plant 45 men received from 71 to 95 cents, 38 men from 95 cents to $1.19, 26 men from $1.19 to $1.43, and 12 men from $1.43 to $1.64 per day. The concern employed last summer 2,000 men. Including machinists, blacksmiths, boilermakers and other mechanics, as well as helpers and day laborers, these employes were paid as follows: 24.65 percent from 71 to 95 cents, 58.86 percent from 95 cents to $1.31, and 16.49 percent above $1.31 per day of nine and one-half hours. These figures do not include boys, apprentices and foremen.

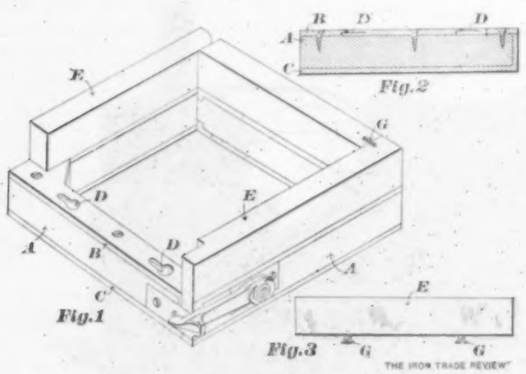
A new gas engine, for which Messrs. Vickers, Sons & Maxim have acquired all patent rights, is the subject of an article in *Engineering*. Only a small engine has been completed; and it is remarkable that this little 1¾-h. p. engine should only consume about the same amount of town gas per indicated h. p. (16 to 18 cubic feet) as a 200-h. p. ordinary type of gas engine under usual working conditions. An engine that gives in one cylinder two impulses per revolution, that explodes its gaseous mixture in contact with water, that has no water jacket or externally-cooled valves, that gives always the same quality of mixture and the same compression for all loads, and, finally, has its greatest efficiency at normal working load rather than at full load, is worth examination. It may seem strange to talk of a gas engine with its cylinder and piston requiring no lubricating oil, and working with the temperature of these parts lower than in a common steam engine, and yet the simple device which makes this possible is the filling of the cylinder with water. There is a general reluctance among designers to the admission of water into a gas engine cylinder and this would promise a lively discussion between the adherents of the new motor and other engineers.

The Superior Chain Co., Marysville, Pa., contemplates moving its plant to Harrisburg, Pa. The works have been operated very successfully for two years, but need more land and Harrisburg is considered a favorable location.

Some New Things for the Shop, Chiefly by Way of the Patent Office.

Molder's Flask.

This is a simple device for saving the time of the molder and very materially cuts down the carpenter shop expense. The improvement has been patented by William Lotz Jr., Christian Wismeyer, Charles S. Hammer, Frederick Thoma and Henry A. Renschler, of Hamilton, O., and has received a thorough trial at the plant of the Hamilton Foundry & Machine Co. The invention pertains to a construction of flasks permitting ready variations in their depths. Fig. 1 is a perspective view of a half flask of the snap type, one of the extension walls being omitted. Fig. 2 is a vertical longitudinal section of one of the walls of the half flask proper and Fig. 3 is a side elevation of one of the extensions. The four walls of the half flask, which may be in the present instance either drag or cope, are indicated by A and have metallic facing strips B on the upper edges. Similar facing strips C are on the lower edges (or joint) at the faces where the cope and drag will meet when the two are put together. Openings of keyhole shape are made in the facing strips B at D, the slotted portions of the holes pointing in the same direction and parallel with the length of the flask wall in which they are located. Extension strips E, one for each of the side walls A, increase the depth of the flask which has the usual latch and hinge and there are buttons F projecting from the lower surface of the extensions to engage the openings D, the buttons being represented as formed by the projecting ends of common wood screws. The openings D have their slotted portions wider below than above, the margin of the slots thickening in a direction away from the eye of the opening. The result is that the extension E may be placed downward upon a supporting wall A with the buttons freely entering the openings D and then an endwise movement of about half an inch will cause the heads of the buttons F to enter under the edge of the slots and the taper will wedge the parts in close contact. The distance the two parts slide to become locked in place is a matter of choice but the amount given is in use with satisfaction. It has been found in practice that if the parts are so fitted that the extensions while fitting with fair snugness can be easily applied by hand and without endwise driving then the damp sand very shortly brings about such a firm locking of the parts that pretty heavy driving is required in removing the extensions.



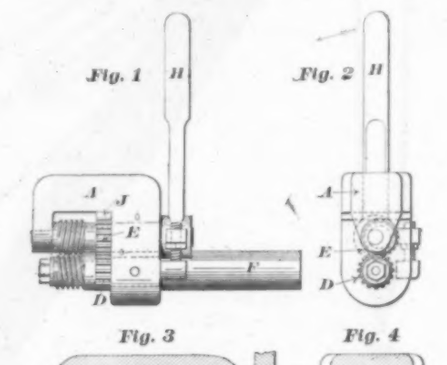
SNAP FLASK EXTENSION.

Extensions of various depths may be kept on hand so that shallow flasks may be constructed and thus reduce the cost of snap flask equipment. It will be seen that the extension strips E overlap at the ends in successive order and are therefore applied serially, the second positioning the first as they are put in proper location. When the extension strips are of considerable depth they may be tied at the corners, as illustrated at G, by means of staples. The joint strips C between the two half flasks are gauged by the usual dowels and dowel holes. The flask formerly used was sent to the carpenter shop when a raising strip was required and this meant a loss of time to the molder in most cases, a delay of some consequence where 350 snap flasks are in service as at the Hamilton plant. These have been equipped with the strips and where the carpenter took from fifteen to twenty minutes to put on the extensions, the molder puts them in place in three minutes and does not mar the surface of the flask with screws. When the snap flask is closed the strips are interlocked and it is impossible to take them off.

Screw Threading Tool.

Charles R. Gabriel, of Providence, R. I., has invented a threading tool for use in lathes. The threading is to be done on the ends of metal tubes and Fig. 1 is a side view of the improved tool, Fig. 2 is an end view, Fig. 3 is a longitudinal section and Fig. 4 is a transverse section through the pinions connecting the two sleeves of the device.

The supporting frame A is of approximately U-shape and the two arms form the bearings for the stud B and the eccentric spindle C. The stud B has a boss at one end secured in the arm and held from rotation by a pin extending through the frame and stud, as shown by dotted lines in Fig. 4. This stud bears the sleeve having at one end the pinion D and at the other the raised spirals. A washer is secured to the end of the journal bearing and holds the sleeve against endwise movement. The eccentric spindle C has a sleeve with a pinion E and a series of raised spirals. The pinions D and E are in mesh and the two sleeves therefore rotate in unison. The raised spirals of the two sleeves are arranged to interlock the ribs of the one between the ribs of the other. A stud extends from the cylindrical bearing and to this the lever H is secured. A bracket projects from the lever and has a screw post so that the rotation of the eccentric spindle C is limited when the post strikes the stop. The pin F extends from the frame A and has a recess into which the head of the lever H enters to form a thrust stop to prevent the longitudinal movement of the eccentric spindle C.



LATHE TOOL FOR ROLLING THREADS ON TUBES.

This screw threading tool can be used on any lathe with head and foot stocks. The pin F is fastened in the foot stock and the tube G is gripped in the chuck; then the foot stock and tool are moved toward the head stock until the end of the tube G bears against the collar on the screw threaded sleeve. The eccentric spindle C is now rotated by the handle H to bring the two screw threaded sleeves with sufficient force against the inner and outer surfaces of the tube and corrugate the shell as shown in Fig. 3. The rotation of the tube gives motion to both sleeves at the same time owing to

the engagement of the pinions D and E and a true screw thread is formed on the end of the tube. When the threading is completed the lever H is moved in the direction of the arrow seen in Fig. 2, the eccentric spindle C turned and the sleeve is lifted from contact with the tube G. The further movement of the lever H brings the pinion E against the friction bar J and stops the rotation of the sleeves. The tube G which is still rotating, unscrews from the sleeve and thus acts to push the tool and foot stock backward in readiness to repeat the threading operation on another shell.

Mold-Making Apparatus.

A reversible molding apparatus of portable character is manufactured by Harris & Co., of Chicago, and Fig. 1 is a vertical section of the invention in position with the flask filled with sand. Fig. 2 is a similar view with the position

Fig. 1

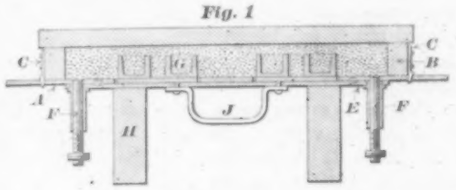
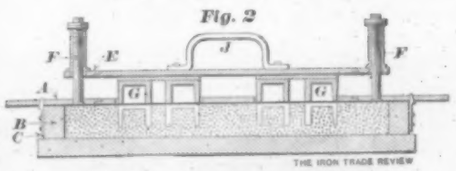


Fig. 2



MAKING THE MOLD AND DRAWING THE PATTERN.

of the parts reversed and the patterns drawn from the mold. Fig. 3 is a half tone representation of the device as lifted from the flask and Fig. 4 is an inverted plan view of the pattern or main supporting plate.

A flat reversible stripping plate A is adapted to fit over the open side of the flask B and has openings which conform in outline to the particular pattern employed and through which the patterns may be projected. When the pattern is gated as in Fig. 4, the separate openings in the plate A are connected by a slot to match the gate. The flask is mounted upon the stripping plate A when the parts are ready for ramming the sand into the flask, keys C being provided to enter holes in the opposite ends of the stripping plate. In order that the stripping plate may be readily adapted for use in connection with various patterns, the openings are preferably formed in a removable section D which fits an opening in A. The edges of the section D and the stripping plate are rabbeted as shown and the parts held together with screws. The stripping plate is extended at

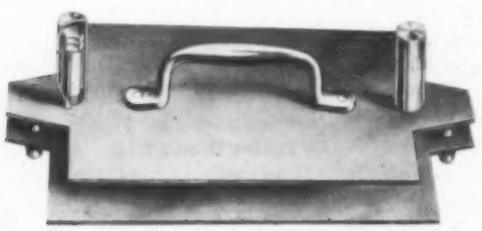


FIG. 3.—THE MACHINE AS LIFTED FROM FLASK.

the ends to be readily grasped by the molder when reversing the apparatus.

The pattern supporting plate E is connected to the stripping plate and is reversible with it. The two plates lie closely together, the former covering the openings in the plate A. The plate B is movable to and from the stripping plate at right angles in order to draw the pattern and, in order to assist the molder in drawing the pattern without damage to the molds, guide pins F are fixed to the stripping plate and have an easy sliding fit in sleeves fastened to the pattern supporting plate E. Plates or mounts for the patterns are interposed between the supporting plate E and the patterns G; these are equal in thickness to the stripping plate and of the same size as the openings for the patterns.

When the sand is rammed into the mold, the apparatus is placed in the position shown in Fig. 1, with the main supporting plate resting upon a pair of stringers H. As soon as the flask is filled with the packed sand about the patterns, the bottom board is placed upon the flask and the combination is reversed to the position illustrated in Fig. 2. The patterns may now be drawn by shifting the supporting plate E, the pins accurately guiding the movement. The supporting plate has a handle J, which can be grasped by the molder as he raps the plate, and in this way he is likely to feel the release of the mold on the patterns and is thus able to regulate the drawing of the patterns closely in touch with the separation of sand and pat-

FIG. 4.—INVERTED PLAN VIEW OF PATTERNS AND SUPPORTING PLATE.

tern surfaces. Check nuts act as stops on the ends of the pins F, and when the patterns have been entirely removed from the mold as shown in Fig. 2, the further movement of the supporting plate will lift the stripping plate A clear of the flask.

A Process of Casting.

The process of casting here described is the invention of H. H. Franklin, of Syracuse, N. Y., and is designed to facilitate the removal of air from the mold. Fig. 1 is a sectional view, partly in elevation, of the apparatus, and Fig. 2 is an enlarged view of one of the sections of the mold seen in Fig. 1. In the casting of articles in metal molds, the air in the molds and the air and other gases introduced with the metal are not expelled from the molds but become mixed with the metal and cause "blow holes." This is especially true when the metal is introduced quickly and under pressure. The specific gravity of a given bulk of metal cast in this manner is less than the specific gravity of an equal bulk of the solid metal. The air may be compressed and diffused through the metal so finely that the bubbles or blow-holes are not perceptible except under a magnifying glass, or the bubbles may be less numerous, and consequently larger. In either case the strength of the casting is less than if it were solid and of natural specific gravity. Fur-

Fig. 1

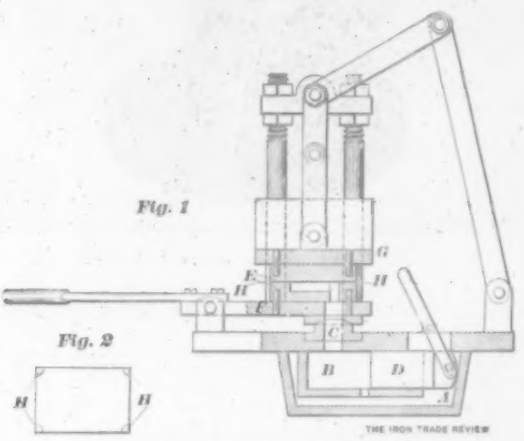


Fig. 2

GETTING THE GASES OUT OF METAL MOLDS.

thermore, the air in the mold increases the difficulty of the casting operation by preventing the easy and satisfactory entrance of the metal to all parts of the mold. If the metal is introduced rapidly, as is usual when pressure is employed, it is apparent that in order to remove the air from the mold by displacement there must be a free outlet. When this outlet is sufficiently large to permit a free displacement of the air, the metal will also escape from the mold and leave a rough place to be finished. In the invention the sections of the mold are held slightly apart during the introduction of the metal, the space being too narrow for the passage of the metal, but suf-

ficiently wide for the exit of the gases. The amount of separation depends upon the size and shape of the casting, amount of pressure, etc. In many cases a separation of three one-thousandths of an inch is enough for the purpose. A is a source of supply and B a communicating chamber. A discharge nozzle C leads from the chamber B and D is a plunger for forcing the material from the metal chamber B through the nozzle C. E is a sectional mold and F and G are opposite supports for the sections. The amount of separation of the surfaces is determined by the projections H.

The Dearsley Molding Machine.

The machine illustrated by the two halftones is the production of John W. Dearsley and has been successfully introduced at the plant of the S. Freeman & Sons Mfg. Co., of Racine Wis. There the machine is employed for small work of an agricultural type, a large variety of castings from small card work to single pieces of a larger size. Two views are shown of the same machine, together with a number of castings illustrating the work for which the machine was particularly intended.

FIG. 1.—THE DEARSLEY MOLDING MACHINE.

The machine comprises a hollow column with a flanged table at the top on which a stripping plate or similar device may be secured. Inside the column is a spider fitted to the bore and having adjusting strips to compensate for wear. The spider has a hub with a pivoted connection to an arm of the lever seen at the side of the machine, and there is a vertical slot of some length in the column for the play of the lever arm. A circular spring acts upon the lever arm and the link, the latter having a series of pin openings to provide for changing the spring tension.

A slot on the outside of the column holds a vertically adjustable bolt and stop to limit the downward movement of the main lever as seen in Fig. 1. A latch on the upper side of the lever engages with a catch projecting downward from the plate at the top of the column when the lever is raised. The stop and the catch are employed to gauge the throw against the resistance of the spring, etc. The top of the spider has a socket for the insertion of a pattern stem, the pattern itself being guided vertically in the stripper plate. The machine is especially useful on work requiring three part flasks, and to this end is capable of a very long draw. The corrugated roll seen resting against the column in Fig. 2 is 10½ inches long, the teeth are shrouded at both ends and a shaft is cast in the center. The molder scores on this job quite heavily, as the roll as it comes from the foundry is ready to be assembled. There is a highly desirable precision about the operation of the machine which in service has removed the possibility of variable thickness in castings. The machine, as shown in Figs. 1 and 2, is arranged to produce the gear, which is also illustrated. All that would be necessary to remove the gear pattern would be the taking out of two setscrews or catches and then unscrew the stripping plate and cage which lifts off as one piece and may be laid away as readily as an ordinary hard match and pattern. Each pattern is provided with a socket threaded to connect with the spider and the main frame or column is bored nearly full length.

The designer in placing the invention in operation has given some consideration to the matter of rust, protection from grit, etc., and all wearing parts are arranged to have brass and iron in running contact. Most of the mechanism is enclosed and the wide spring blade he has adopted forms a good cushion for patterns of long or short draw. The several castings assembled in Fig. 2 are collected to show very different work, but handled with equal ease. The two small rolls are 5½ inches high, are gated together and produced in a snap flask. The rest of the group of castings required two and three part iron flasks.

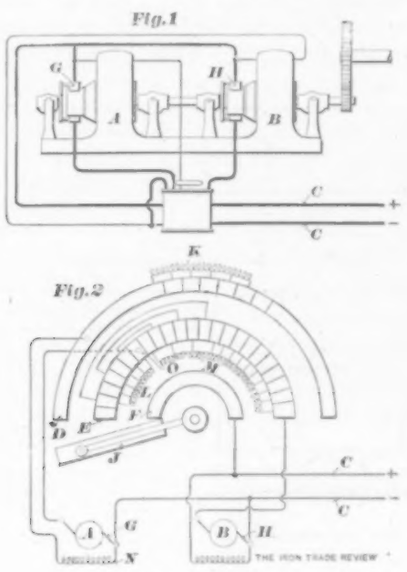
FIG. 2.—ANOTHER VIEW OF DEARSLEY MOLDING MACHINE AND SAMPLES OF ITS WORK.

An Electric Drive.

Joseph A. Schaefer, of Chicago, has patented an electric drive intended for such machines as require to be operated smoothly and at the same time permit of gradual increase of speed, frequent starts and stops as well as movements of a slight degree, as in the partial rotation of rollers, etc. The power mechanism proposed comprises two motors of different normal speeds, and having a permanent mechanical union with each other and coupled to the load through a common means, as for example a gear with fixed connection to both motors. The slow speed electric motor has comparatively small power and the high speed motor is on the contrary intended to run the machine at normal speed and full load. The armatures are attached to the one shaft and direct current motors are adapted to the purpose. A controller is employed for each motor, the controller for the slow speed motor first being operated to bring it to maximum speed, the controller for the high speed motor being operated in time to effect torque on the common shaft, so that the latter will have a turning effort exerted when the controller throws the first motor out of action. By the

agency of the two motors, a torque that increases gradually from minimum to maximum is impressed upon the shaft, the initial torque being exerted by the motor of low speed and small power. A gradual increase in speed and torque brings them within the range of the motor of larger capacity, which then assumes the burden until the normal rate is attained. The two motors thus act in the place of a single motor, though they are not simultaneously supplied with power, except where the work of the one is taken up or continued by the other, the armature of the idle motor being then an increment of but small consequence to the total load.

Fig. 1 is a side elevation of an electric combination of the kind proposed, the circuit connections being diagrammatically indicated. Fig. 2 is a more diagrammatic illustration of the system. The motors A and B may be mounted on the one base and connected by the working shaft passing through the armatures. The motor A may be considered the slow speed motor, and the motor B is of higher speed and power. The motors are supplied with current from the common mains C. Each motor has a controller, the two being merged in the one piece of apparatus with a single regulating lever as in the rheostat illustrated. This compound controller has three segments, D, E and F, the contact F being connected directly with the one main C and common to the entire controller as shown. The companion main C is wired to the brushes G and H of the motors, the connecting brushes on the opposite sides of the commutators being



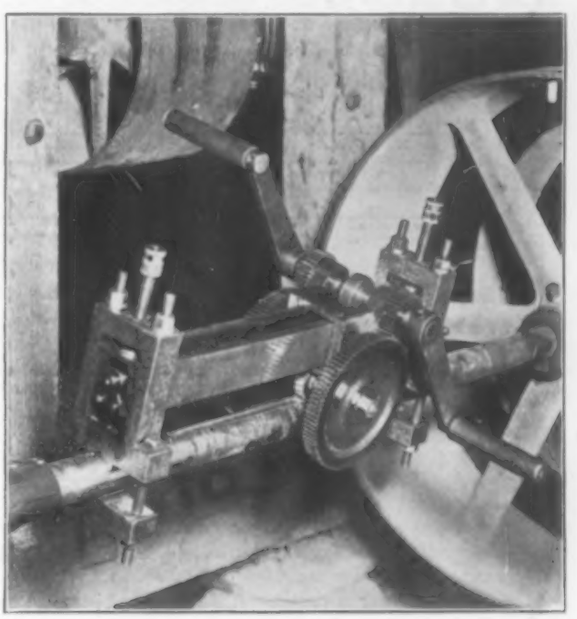
A NOVEL MOTOR DRIVE.

attached to one of the contacts in the segment E, which is subdivided into sections in the usual manner of rheostat construction. The handle has a contact blade J connecting the terminal F with a particular plate of the row E, so that either or both of the motor armatures may be connected in bridge of the supply mains as desired. The field winding of the motor B is permanently included in circuit with the mains C, while the field winding of the motor A is excluded from the circuit when the main motor B is full in operation. To this end the set of contacts D is interposed between the field winding and the connection with one of the supply mains, the brush J joining the plate D and F to bring the field winding in circuit. The active plates of the group D are united by the resistance K and the field may be gradually excluded or included in circuit. The rheostat resistance L associated with the set of contacts E is peculiar to the motor A, while the resistance M is peculiar to the other motor, B. These resistances are subdivided in the ordinary manner. Some of the contacts E connected with the resistances L and M are so related that when the auxiliary motor is relieved by the main motor, or in reducing the speed when the main motor is replaced by the auxiliary, the transition may be gradually accomplished, both motors for a time being active in torque production. Conductors may therefore unite contact plates connected with the resistances L and M.

Assuming that the load is at rest and that it is to be brought to speed, the controller handle J, as it appears in the engravings, may be moved in a clockwise direction, first completing the field circuit N, next closing the circuit through the armature of the motor A, through all the resistance L, which is gradually cut out of circuit until the contact blade reaches the plate O, with which the lower brush of the commutator on the motor A has direct electrical connection. At the point O all the resistance in circuit with the armature of the motor A will be cut out. The handle J in traveling from the plate O includes the armature of the motor B in circuit with the mains C, the entire resistance M being at first included. As the arm J swings around the arc of contacts, the resistance M is by degrees cut out, the series of conductors gradually introducing the resistance L into the armature circuit of the motor A. Finally, after the electrical connection of the blade J with the last of the conductors seen on the outside of the segment circle E, the armature of motor A is entirely cut out of the circuit. The handle J continuing along the arc the balance of the resistance M is cut out and the armature of the motor B is included in the circuit without outside resistance. The resistance K, in addition to regulating the field, is intended to prevent sparking.

Keyseat Cutting Machine.

Thomas J. Bloss, of Boaz, Ala., has invented a portable milling machine for cutting keyseats in shafting, and the illustration depicts the tool in position for this purpose, and also shows 18 inches of keyway cut with one setting of the machine. The milling machine consists of two clamps to grip the shaft, and having at the upper ends openings for the hollow bar containing the feed screw. The latter fits in bearings at each end and extends far enough for a collar and a squared end for a crank. The hollow bar carries a sliding frame with bearing for the cutter arbor and the drive shaft, these being connected by gears. The drive shaft has a worm which meshes with a gear on the feed screw and when the feed screw is held from rotation the turning of the worm gear on the fixed screw will carry the sliding frame and the milling cutter from end to end of the hollow bar. A latch at the end of the main frame is used to hold the feed screw when the cutter has been fed into the shaft to the required depth.

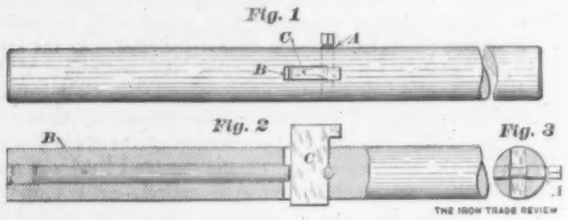


A PORTABLE KEYWAY CUTTER.

Centering Device for Boring Bars and Cutters.

Charles Sternberger and Julius C. Busch, of Milwaukee, Wis., have a method of permanently locating the exact center line of a boring bar for the use of interchangeable cutters. Fig. 1 is a boring bar with centering gauge substituted for the cutter and the relation of the pin is shown by dotted lines. Fig. 2 is a view at right angles to Fig. 1, and Fig. 3 is a sectional view of the bar drawn on the line of the centering pin. Fig. 4 is from a complete working drawing of the equipment.

The boring bar is slotted for the cutter, bored for the rod and tapped at the outer end. A centering pin A is inserted in the rod at right angles to the slot and co-operates with the rod B in holding the cutter. The cutter has a notch to fit the pin A. The latter is cylindrical, but the portion which crosses the slot is of smaller diameter and its center is out of line with the center of the other portions of the pin, thus forming an eccentric bearing for the cutter. As the cutter is forced against the



A METHOD OF CENTERING BORING BAR CUTTERS.

pin by the rod B in order to center it, the rotation of the pin A will gradually change the adjustment transversely of the bar and the latter can thus be centered accurately. A gauge plate C is employed for permanently adjusting the pin, and is formed similarly to the cutter, but has a projecting lip extending over the unslotted portion of the bar. By inserting the gauge first on one side and then the other, applying the calipers, turning the pin and again making the caliper tests, the exact center of the bar may be located. The pin A may then be riveted and the head broken off.

taper from one side of the block to the other, as seen in Fig. 2. Two keys D are fitted to the openings and wedge the rods securely in contact with the notches.

Detecting the Temperature of Metals.

Albert Sauveur, of Cambridge, and Jasper Whiting, of Lexington, Mass., have an invention to provide automatically for the detection of the excess over the critical temperature as the metal emerges from the finishing machinery. The improvement provides further for the automatic selection of the metal pieces finished at too high a temperature. The inventors point out that when steel is cooled from a high temperature to a certain point which is in commercial steel not far from 675 degrees centigrade, a sudden retardation in the rate of cooling occurs and for a time the metal ceases to cool. The temperature indeed may increase and after awhile the metal resumes the normal rate of cooling. The crystallization of the steel continues until the critical thermal point is reached, but below that there is no further growth. The finishing temperature should not therefore exceed the critical temperature. Steel is magnetic at temperatures below the critical point, but is non-magnetic at a higher heat, and this peculiarity has been utilized for the purposes of the inventors. A number of variations of the idea are suggested; a magnetic detector for indicating the temperature, a magnet which would develop motive power to determine the course of the rails or other shapes as they came from the rolls, etc.

One of these has been chosen for illustration as best exhibiting the general scheme. Here a steel rail is tested as to temperature and then unmistakably receives the verdict of the machine. The rail A as it comes from the finishing rolls

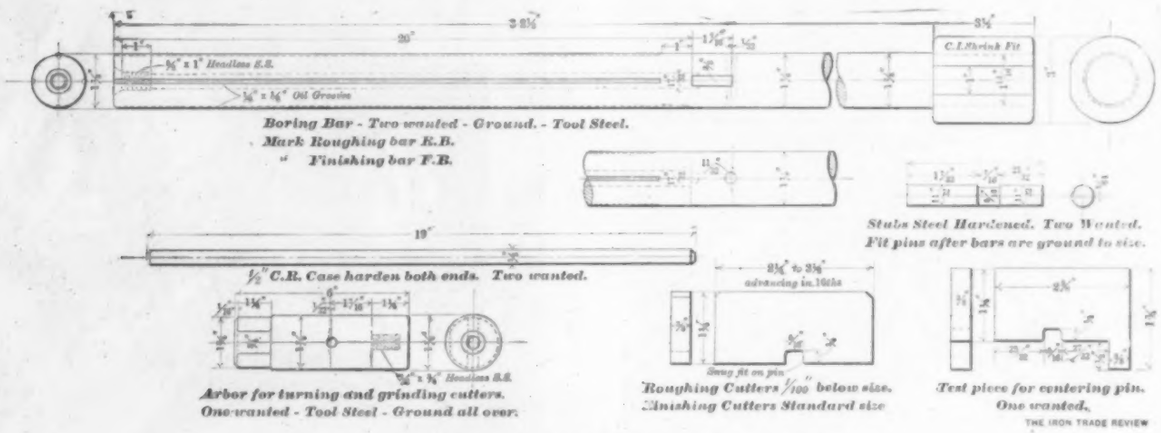
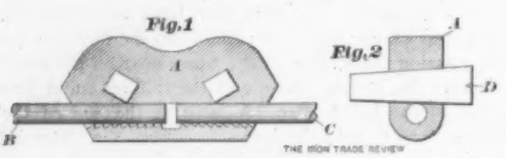

Boring Bar - Two wanted - Ground. - Tool Steel.
Mark Roughing bar R.B.
" Finishing bar F.B.
Stubs Steel Hardened. Two Wanted.
Fit pins after bars are ground to size.
1/2" C.R. Case harden both ends. Two wanted.
Arbor for turning and grinding cutters.
One wanted - Tool Steel - Ground all over.
Roughing Cutters 1/100" below size.
Finishing Cutters Standard size
Test piece for centering pin.
One wanted.
THE IRON TRADE REVIEW

FIG. 4.—WORKING DRAWING OF BORING BAR EQUIPMENT.

The notched cutter is preferable to the common type which fits on the ends of the slot in the boring bar. The cutter with wide square gap is apt to warp and a set of them will have very uneven shrinkage, leading to much annoyance. The centering pin is made sufficiently eccentric to meet any inaccuracy in drilling the bar. These bars and cutters have been in use at the plant of Pawling & Harnischfeger for the past two years.

Rod Coupling.

The inventor, Henry A. Dulinsky, of Nottingham, Ind., proposes a coupling for the purpose of connecting the ends of rods



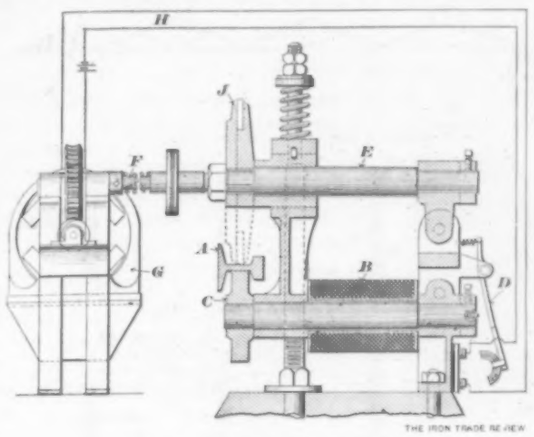
A ROD COUPLING DEVICE.

or pipes. Fig. 1 is a longitudinal section and Fig. 2 is a cross section through one of the key openings in Fig. 1. A is an oblong block with an opening through the lower portion to admit the ends of the rods B and C. The opening for the rods has at the lower side a series of notches arranged in two sets, each set pointing inwards toward the center of the block. At right angles to the rods are two square openings and these

undergoes the action of two magnets, one of which is illustrated at B. There are two magnets arranged horizontally and each identical with B. The plane of section, however, only presents one, as seen in the illustration. The cores of the magnets B are steel shafts running in a brass frame and each has a roller C over which the rail passes. Near the opposite ends of the shafts is an armature D pivoted to the brass frame and normally held away from the shafts by a spring. A third shaft E is located above the magnets B and turns in a pair of bearings capable of some degree of vertical motion and subject to the pressure of two powerful springs mounted on anchor bolts reaching from the base of the machine; one of these springs and anchor bolts is shown in the engraving. The shaft E carries one member of a friction clutch, the other member being splined to a shaft F, which in turn bears a worm gear in mesh with a worm on the armature shaft of a motor G. Fixed to the end of the shaft E is a die J which is represented as a segment of a wheel made in two parts and clamped together with a series of characters between them. The motor G is in a circuit H terminating in two electrodes arranged to co-operate with a bridge piece carried by the armature D.

When a rail which is cold enough to be magnetic passes over the rollers C it bridges the air gap and thereby allows the magnetic flux, which is passing through the steel shafts, to be increased many times, the two magnets constituting a horseshoe magnet of much more power than the combined magnets B before they were joined in this manner. The mag-

nets B then overcome the power of the spring on the keeper D and close the bridge and circuit. Motor G is now in operation and the die segment J is rotated until the first character is brought against the rail, after which the movement of the rail rotates the segment positively until the last character passes out of contact. As soon as the rail leaves the two rollers C, the spring returns the keeper D, opening the circuit and stopping the motor. When the rail passes over the rollers C at a temperature above the critical point and therefore too high

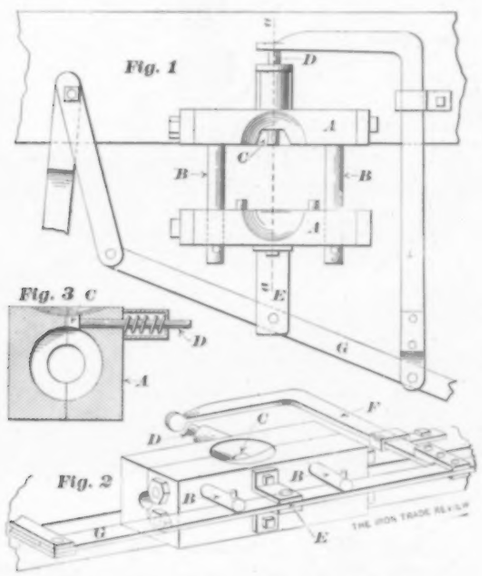


A MECHANICAL RAIL INSPECTOR.

to be magnetic, the armature D is not operated and the idleness of the machine indicates to the workman that that particular rail was improperly finished and the absence of the mark is another indication of the quality. An advantage incidental to this form of the invention is in the fact that the properly finished rails, though mixed with other rails finished at improper temperatures, can at any time be distinguished from the others by the mark left by the die.

Manufacture of Wheelbarrow Wheels.

The improvement devised by Thomas D. Harris, of Ashmore, N. C., relates more particularly to the molding of wheelbarrow wheels and to the quick ejection of the castings when made. Fig. 1 is a plan view of the invention in an open position; Fig. 2 is a perspective view of the device in a closed position, and Fig. 3 is a transverse section on the line a-a of

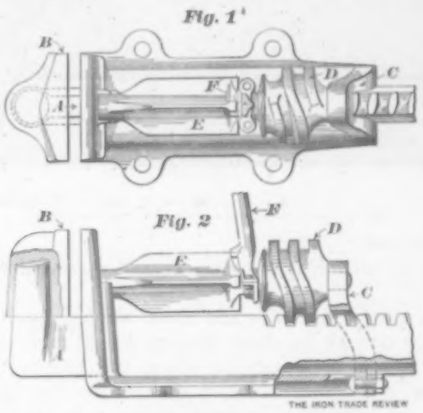


CASTING PRODUCTION AND EJECTION FROM MOLD.

Fig. 1. The two-part sectional mold A has a stationary and a sliding half, arranged to be brought compactly together on the guides B. The mold sections have enlargements forming the gate or sprue C. One mold section has a spring pressed plunger D, movable in a passage intersecting the pouring gate, and the other has a hand-operated lever at E; this lever G is attached to an arm F, which has one end opposed to the plunger D. When lever G separates the mold sections after casting is completed, the arm F moves the plunger D into the plane of the sprue C and ejects the casting from the section. The rod D is seen in Fig. 1 entering the mold cavity as the halves of the mold are separated.

A Vise.

Eli Shupe, of Racine, Wis., has a vise shown in plan view in Fig. 1, the operating handle being seen in section and a part of the rack bar broken away. Fig. 2 is a side elevation, partly broken away. The fixed jaw and base are in one piece and have a sliding bar A which carries a pivot at the outer end for the attachment of the movable jaw B, the pivot is tapered so that the connection with the jaw B will be free from lost motion and at the same time the jaw will be free to oscillate. The opposite end of the bar B is formed with a series of teeth passing through the lower end of a bracket C secured to the base of the vise. The rack engages with a worm D, having a journal attached to the upper end of the bracket C. A winged shaft is fastened to the worm D, the four wings E serving to



QUICK ACTING VISE FOR IRREGULAR WORK.

rotate the worm D rapidly by hand for a speedy adjustment of the vise jaws. When the jaw B is to be moved with considerable force, the rotation of the worm D is effected by the lever F, having at one side a tooth adapted to engage with the ends of the wings E.

Consolidation of Skein Works.

Former United States Senator James K. Jones, of Arkansas, and J. G. Johnson, of Peabody, Kan., have been stockholders and directors in the Racine Steel & Iron Mfg. Co., Racine, Wis., for four years. They have now purchased the equipment and business of the Columbus (O.) Skein & Iron Works, the Sandage Skein Works, South Bend, Ind., and the W. B. Mitchell Foundry Co., Grand Crossing, Ill., and have increased the capitalization from $250,000 to $500,000. Daily newspapers have erroneously connected the Columbus Iron & Steel Co. with the purchase made by Messrs. Jones and Johnson.

The consolidation company is said to be in no sense a trust as it does not seek to control the output of wagon skeins. It will have two competitors, the Illinois Iron & Bolt Co., of Carpentersville, Ill., and the Studebaker Bros. Mfg. Co., of South Bend, Ind. The business will probably be concentrated into one or two factories and the cost of production will be greatly decreased thereby. This will make the Racine Steel & Iron Mfg. Co. by far the largest producer of wagon skeins in the United States.

A series of noteworthy views of New York is on a 12 x 24-inch sheet sent by the Robins Conveying Belt Co., of New York. The illustrations comprise contrasting pictures of the present day city and its predecessor of 250 years ago. There are halftones of the two typical structures, the Flatiron and Park Row buildings. The Robins Conveying Belt Co. is located in the latter.

A petition has been filed in the Cincinnati courts asking that the Dayton Gas Engine Co., Dayton, O., be declared bankrupt.

Re-roofing a Shop While Work Goes On.*

BY R. H. FOWLER.

To members of the Institution who are connected with old established works, a description of a method of re-roofing their shops without interfering with the work, may be of interest.

At the Steam Plough Works, Leeds, it became necessary to put roofs on the boiler shop and black store and fettling (repair) shop. Fig. 1 is a ground plan of the two shops, from which it will be seen that the boiler shop was divided into two bays, each 50 feet wide by about 270 feet long. The fettling

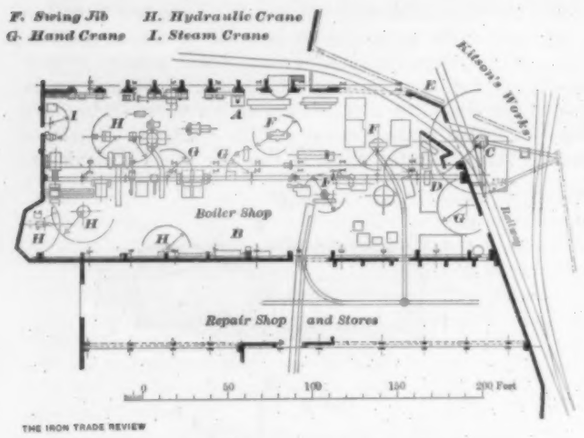
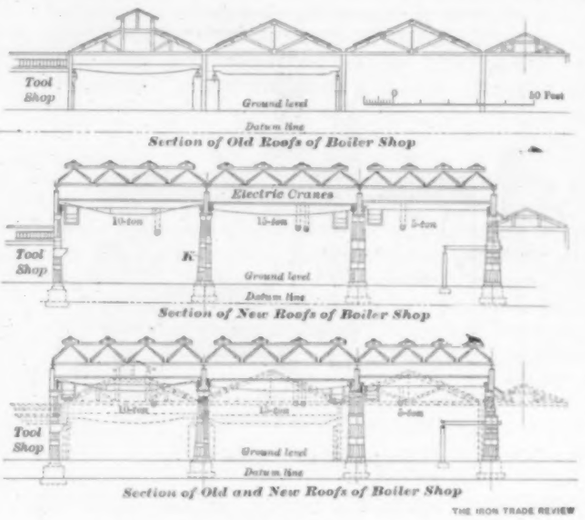


FIG. 1.—GROUND PLAN OF BOILER AND REPAIR SHOPS.

shop was also 50 feet wide and about 280 feet long. Fig. 2 is a section through the shops showing the old roofs, and Fig. 3 is also a section through the shops, but showing the new roof. Fig. 4 is a combined plan showing the two roofs. In bay A of the boiler shop the usual bending rolls, punching and shearing machines, drills, etc., were fixed, driven from shafting attached to the beams of the roof. In bay B of the boiler shop a steam-crane traveled from end to end, and in the fettling shop an electric crane also traveled from end to end of the shop.

As practically the whole output of the Steam Plough Works depended on the supply of boilers, it was an absolute necessity that work in the boiler shop should be carried on without any stoppage. It was therefore impossible to adopt any plan of raising the parts of the new roof from the floor inside the shop. Another important consideration was that the men working in the shops should be in absolute security, and feel that they were so, during the operations above. It was therefore decided to deal with one bay at a time and to construct a platform over the old roof for the full length of the shop, and to make this platform of sufficient strength to carry the tackle required in fixing the roof, and also the girders for carrying the roof, and to transfer this platform to the other two bays in succession.

The two shops are practically closed in on three sides, leaving only one end from which the work could be conducted. This available end is shown on Fig. 1, where is also shown the railway which brings material into the boiler shop, and is also connected with Messrs. Kitson's Works, and consequently



FIGS. 2, 3 AND 4.—ROOF SECTIONS OF SHOPS.

had to be kept free while the operations connected with the roofs were carried on, and along this railway also the whole of the material for the roofs had to be brought. At the point C on Fig. 1, a steam derrick to lift 4 tons was fixed, this derrick being of sufficient height to place all the material for the roofs on to the platform, and with a jib of sufficient length to place the first girder D for carrying the platform in position. At the opposite end to this girder the first piece of platform was carried on an old brick wall of the shop marked E. When this girder was fixed, the first piece of the platform was erected, on which the cranes (to be described farther on)

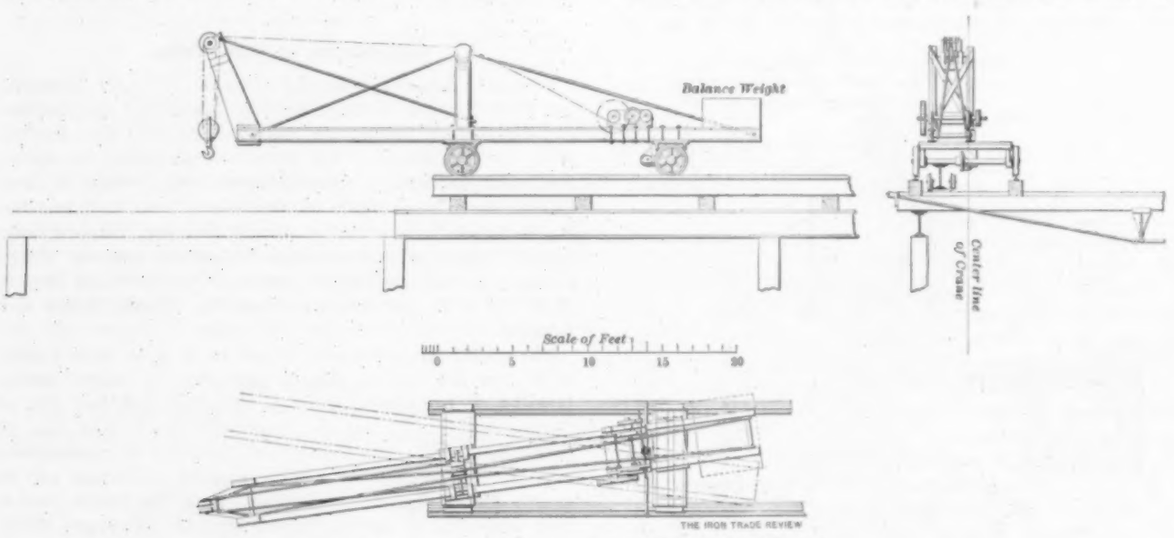


FIG. 5.—TRAVELING CRANE FOR LIFTING ROOF GIRDERS.

could be worked. Bay A of the boiler shop was the first one to be dealt with, and this necessitated a row of stanchions on each side, and as these stanchions had to be fixed in such positions as would not interfere with the existing walls and columns, the width of the shops had to be slightly altered. All the stanchions were made in two pieces for convenience of erection. To erect the stanchions, holes were made through the old roofs, and each stanchion was erected by means of a single pole, the power for lifting being obtained from a winding forward drum on a traction engine, and by this means all the stanchions were put up during meal times. When all the

*Read before Institution of Mechanical Engineers.

stanchions for one bay were in position, the next operation was to fix the crane and roof girders. To accomplish this a traveling crane, shown on Fig. 5, was constructed with an overhanging jib of sufficient length to carry the girders, 25 feet long, when suspended from the center, from stanchion to stanchion. This traveling crane was mounted on a railway 8 feet 6 inches gauge, and of sufficient height above the platform to allow a narrow-gauge railway to run under it, on which the roof girders and crane girders were moved along on specially constructed lorries, and as the platform could not be constructed of sufficient width to allow this crane to be over the centers of the girders, it had to be made with a movable jib, as shown on the plan. As soon as a pair of girders, one on each side of the shop, were fixed, the trussed beams for carrying the platform were placed in position by means of a somewhat rough but very useful movable jib crane, consisting simply of two baulks of timber mounted on some old traction wheels, with a small crab at the rear end and a fixed block at the end of the jib. The trussed beams were placed at a distance apart of 8 feet 4 inches center, but this crane was made with such an overhang that the weight of the crane and the load it was lifting should be distributed over not less than two trussed beams. This crane ran on a wooden track in the center of the platform. As soon as a trussed beam was fixed in position the space between it and the one behind it was covered with 3-inch planks all cut to dead lengths; the crane and track were then advanced and another trussed beam put in position and covered over as before. Three trussed beams were fixed on each girder, consequently when the platform from end to end was completed it was composed of about 30 trussed beams 8 feet 4 inches center, carrying a platform or deck 3 inches thick. By this method two roof girders and two crane girders and two trussed beams and the platform were fixed in a working day.

In order to facilitate the making of the platform two 20-inch gauge railways were laid, one on each side of the center crane. On these railways were carried all the planks and other material required. The roof principals were lifted on to the platform by the steam derrick, in two halves, each half was put on a trolley on the 20-inch gauge railway and conveyed to the far end where the halves were riveted together. When the platform was completed, the wooden crane was taken away and the crane used for lifting the girders was brought into the center of the platform, and employed for lifting the roof principals and putting them in their proper positions. This crane was also used for lifting out the trussed beams as the work proceeded. The roof principals are placed at a distance of 12 feet 6 inches apart, consequently either one or two trussed beams had to be removed before each pair of principals could be fixed. The whole of the platform and all the principals for the roof of bay B were fixed in three weeks ordinary working time. As the principals of the new roof were erected, the planks that had formed the platform on the top of the trussed beams were then used for making a scaffold or platform inside each of the four divisions of each roof. On this platform was then deposited, as required, all the glass, slates, and timber necessary for the new roof The glazing, timbering and slating were then done with great rapidity, and by this means the whole of the last roof was glazed and slated in a fortnight.

FIG. 6.—THE TRAVELING CRANE.

Fig. 6 shows the traveling or swiveling crane with a girder suspended ready for dropping on to its stanchions. Fig. 7 shows the same crane lifting a roof principal into its position. Fig. 8 also shows the same crane with a trussed beam that has just been lifted off the girders.

The stanchions for bay B of the boiler shop had to be erected between the existing longitudinal girders of the traveling crane and the wall of the shop, so as not to interfere with the old traveling crane. It became necessary, therefore, to make these stanchions in such a way that the back leg K could be fixed after the old roof and wall were taken down. Details of the roofs are given in Fig. 9. They are of the ridge and valley type, each roof divided into four ridges. They are glazed on each side with Heywood's patent glazing, with a slate ridge and ventilation for the whole length of each ridge. This type of roof is well adapted for shops where only top light can be obtained.

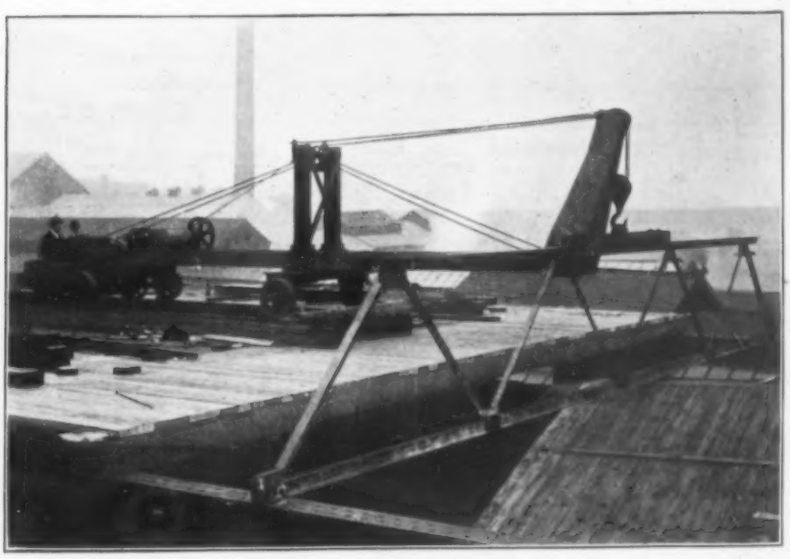


FIG. 7.—ANOTHER VIEW OF THE TRAVELING CRANE.

At the commencement of the paper two points were mentioned that had to be considered, namely the security of the workpeople, and no interference with the output of the shop, and it is pleasing to be able to state that no accident occurred during the whole time the work was being carried out, and that the work of the shops went on without the slightest interruption. After the erection of the swiveling crane the work on bay A was completed between the end of August and the end of October, and the two other bays were commenced the following spring and finished about the end of October. The work was designed and carried out, and all the appliances designed and made by the staff at the Steam Plough Works, as it was quite impossible to employ any contractor on work of this nature.

The Portable Electric Safety Light Co., 188 Railroad avenue, Jersey City, N. J., recently incorporated with a capital of $250,000, will manufacture electrical supplies, including an electric safety lamp for the use of miners.

SOFT COAL IN THE PITTSBURG DISTRICT.

The production of soft coal in the Pittsburg district for 1903, according to statistics compiled by the *Black Diamond*, amounted to 31,300,000 tons. The largest producers were: Pittsburg Coal Co., 18,000,000 tons; Monongahela River Consolidated Coal & Coke Co., 7,500,000 tons; Pittsburg & Buffalo Co., 1,500,000 tons; J. W. Ellsworth & Co., 1,000,000 tons; United Coal Co., 750,000 tons. The shipments to the lakes exceeded those of 1902 by nearly 1,200,000 tons. Commenting on

FIG. 8.—TRAVELING CRANE LIFTING TRUSSED BEAM.

the record of the Pittsburg & Buffalo Co., the Pittsburg correspondent of the *Black Diamond* says:

"The showing made by the Pittsburg & Buffalo Co., the largest independent operator in the country, and its constituent concerns, was a pleasant surprise to the most sanguine. The majority of the large mines of this company were but recently placed in operation. Official announcement is made that the company contemplates increasing its capacity from 50 to 60 percent in 1904; the following year its output will be doubled. The Pittsburg & Buffalo Co. operates the Hazel mine at Cannonsburg, the largest and most modernly equipped mine in the country, and Johnetta mines one and two at White Rock, on the Allegheny Valley railroad. The Manufacturers & Consumers Co., an underlying concern, operates the Bertha mine at Bruce Station, on the Baltimore & Ohio railroad; the Blanche mine at Mt. Venitia, on the Wheeling division of the Baltimore & Ohio, and the Rachel mine at Wilson Station, on the Monongahela division of the Pennsylvania railroad. The Johnetta Coal Co., another constituent concern, operates the Francis mine at Burgettstown. The production for the year, as noted above, aggregated 1,500,000 tons. The Pittsburg-Buffalo Co., which has recently been incorporated, intends to increase its capital stock to $6,000,000. Eight more large mines are to be opened on the Monongahela division of the Pennsylvania, the Baltimore & Ohio and Wabash railroads. The Francis mine of the Johnetta Co. was just completed. During the year it produced only 5,000 tons, while the new year will show something like 500,000 tons. The number two mine at White Rock has produced not more than 5,000 tons, while this year will put out 300,000 tons.

"The two largest contracts ever awarded to a local independent concern in the history of the local industry have been received by the Pittsburg-Buffalo Co. The contracts have been let by the Pennsylvania Railroad Co. and the Baltimore & Ohio Railroad Co. Last year another local firm supplied these railroads with their coal. Although the deal was closed last June, it has just leaked out, and has been confirmed by the interests concerned. The contract was made on last April and May prices and consequently brought high prices. The Pennsylvania railroad has agreed to take 500,000 tons of coal annually for three years from the Pittsburg-Buffalo Co., while the Baltimore & Ohio will use 200,000 tons annually for three years."

The Harper Machinery Co., Park Row building, New York, recently incorporated in New York, the object being to facilitate business, the same corporation being already incorporated in the State of New Jersey. The company deemed it necessary to incorporate in New York state also, as it has the agency for the National Hoisting Engine Co. and thought that the second incorporation would better enable it to place this company's product before the market in proper form. The Harper company is now prepared to quote contractors on complete outfits either for sale or rent.

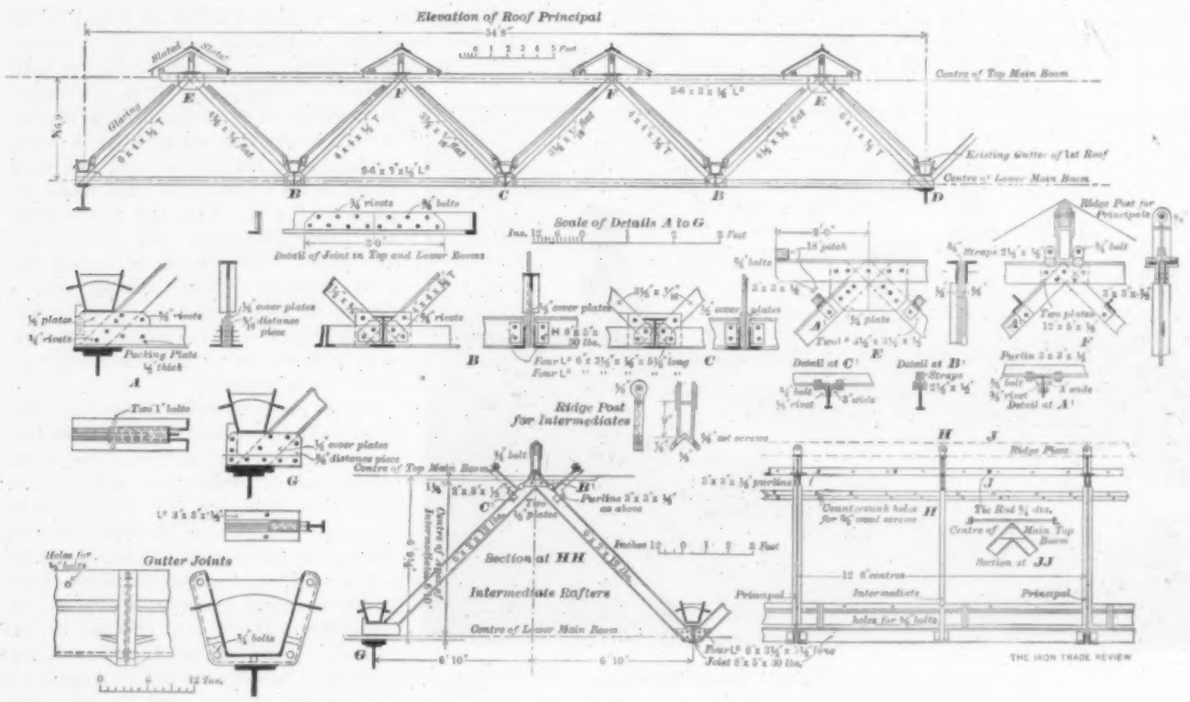


FIG. 9.—DETAIL DRAWING OF NORTH BAY OF BOILER SHOP.

P. F. Leach, president and manager of the Toledo Castings Co., has purchased the Chicago Brass & Copper Works, Chicago, including stock, plant, patents and good will. Mr. Leach will continue the business of the Chicago plant, manufacturing journal bearings and brass and copper castings for locomotives and cars.

Cincinnati Machinery Market.

CINCINNATI, Feb. 2.—The past month has developed nothing new in the general situation. The demand has neither shown improvement nor further falling off. The plants are working along the same lines as for the past four months. Manufacturers are acquainted with present conditions and are more concerned about the outlook than perhaps any other feature of the situation. There is no disposition to look upon the future with pessimism and in fact the general tone of comment from the concerns engaged in the machine tool industry is cheerful. This feeling is not without some reason. In the first place the run of inquiries has been more general and heavier than in the past few months and this seems to stimulate the belief that demand is rather dormant than dead. It is also asserted that the stocks of machine tools in the hands of agents are down to the minimum and are kept down because quick deliveries can now be obtained direct from the manufacturer. This enables the manufacturer to keep a close check on the actual demand for his machines, as every sale means an order on the shop while in the past he was in the dark as to the exact number of machines on the floors of agencies. Again this method of selling furnishes money more promptly, as agencies were slow in remitting for machines on hand unsold. When the revival in the trade comes these depleted stocks will again have to be filled up and this will absorb the stocks the manufacturers are now carrying.

The number of inquiries coming in and reports from agents all indicate that there is a call for machines or will be as soon as a more confident feeling is established in machinery lines.

The Lodge & Shipley Machine Tool Co. has had about the same volume of business as in the past two months and regards the outlook with a feeling of confidence. Inquiries have been good, indicating that there are machines wanted, but that manufacturers are holding off and are maintaining a waiting attitude. This is not expected to be of long duration.

The Cincinnati Milling Machine Co. reports a better month than December and a good volume of inquiries. The company is putting out a new motor-driven miller and has some very satisfactory correspondence in the way of inquiries for prices, etc., on this new machine. It is expected to be a good seller now that motor-driven tools are coming into preference by many concerns. Foreign business constituted a large part of the orders last month.

The Cincinnati Planer Co. calls the business quiet and the month shows no improvement over December. Conditions do not appear to indicate that this year can be looked upon to furnish much beyond an ordinary volume of business.

Greaves, Klusman & Co. say that business is holding up fairly well and from the amount of inquiry they have confidence in the outlook for better conditions in the spring.

The John Steptoe Shaper Co. is keeping busy, with a fairly good general run of orders. Some foreign business is reported. Correspondence in hand is decidedly encouraging and the improvements the company is making in its line encourage belief in an enlarging business.

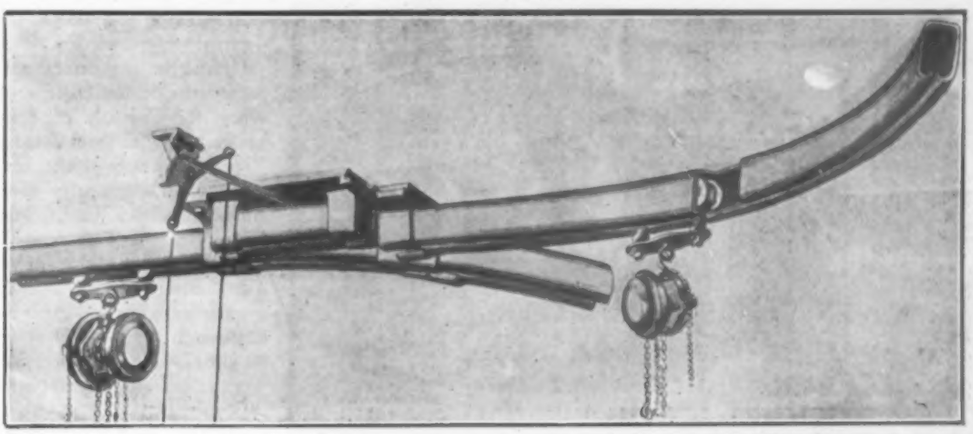
The Niles Tool Works, of Hamilton, O., at a stockholders' meeting on Jan. 26, elected the following directors: James K. Cullen, R. C. McKinney, George T. Reiss, Joseph L. Blair and Col. Miles T. Watts, of Cincinnati. The directors organized by electing James K. Cullen president, George T. Reiss vice president, Joseph L. Blair secretary, Charles L. Cornell treasurer and Lucius B. Potter assistant treasurer. The meeting was also attended by the managers of the various plants, the branch offices and the salesmen. The party went to Hamilton in a special car from Philadelphia. George T. Reiss was formerly secretary of the company.

The American Machine Tool Co. is gratified at being as busy as it is under the prevailing conditions. The company has nearly a full force on and quite a good deal of work in hand.

The Cincinnati Machine Tool Co. says there is a better inquiry for tools and the outlook is quite promising. The severe weather has retarded work on the new building the company is erecting and the new quarters will not be ready for occupancy as soon as expected.

BALL BEARING SWITCH FOR OVERHEAD TRACK.

The ball-bearing switch shown in the accompanying engraving will be of interest to those using overhead tracking. The frame of the switch is bolted to the overhead supports, and a steel plate, to which are fastened the sections of track connecting the different lines, operates in this frame. The ends of the plate and the parts of the frame which support it have V-shaped grooves in which are placed hardened steel balls. The switch is operated from the floor by means of ropes attached to the ends of the controller arms, a rod connecting the controller and the sliding plate. The notches in the curved part of the controller correspond to the different positions of the switch, and a ratchet actuated by a spring operates in these notches, securely holding the switch in the desired position.



BALL BEARING SWITCH FOR OVERHEAD TRACK.

The construction is simple and the switch being ball-bearing, the pull on the hand rope necessary to operate it is very light, but a little more than that required to counteract the pressure of the ratchet spring. The vertical distance required for the switch above the top of the track is only two inches, which makes it especially adaptable for places where head room is an important factor.

As will be seen, the switch may be placed any distance above the floor without disadvantage, it being operated simply by a pull on one of the ropes. For lines of track which intersect at any angle where it is not convenient to put in curves leading to a switch, a ball-bearing turntable working somewhat similar to the switch may be used. The turntable can accommodate any number of lines of track converging at one point, and no curves are then necessary.

The switch shown is used in connection with I-beam and hollow track, but the manufacturers also build another style of ball-bearing switch for use with flat or bar track. The switch and turntable are manufactured by the New Jersey Foundry & Machine Co., of New York.

THE CASKEY PNEUMATIC PUNCH.

This device recently placed upon the market by the Chicago Pneumatic Tool Co., of Chicago, is another of the constantly increasing examples of the successful application of compressed air to practical uses. The first Caskey punch ever built and of crude design and entirely different from the finished product now shown, was capable of cutting satisfactorily 90 percent of the holes in two torpedo boat destroyers. It was not until two years later that the tools were put on sale and the interim was devoted to the work of improving them. This practice has been continued and at the present time the punch has been perfected to a high efficiency. The tools have speed, accuracy, light weight in comparison with capacity, and have been developed into very convenient forms. The machines are built special for extraordinary purposes but the tool for general service is illustrated in Fig. 1 and the details of the mechanism are exhibited in Fig. 2.

FIG. 1.—THE CASKEY PUNCH AT WORK.

The ball piston B carrying the tail rod or intensifier C is seen in the extreme rearward position, the end of the stationary hollow rod D being at the approximate center of the ball piston. When the piston begins its stroke impelled by the constant air pressure from A, the rod D telescopes into the tail rod C and at once seals all communication between the tail rod and the interior of the piston proper.

As the piston and rods D and C are kept filled with oil it will be seen that the entire air pressure back of the piston is concentrated upon the column of oil contained in the rod D and the passages leading to the punch ram chamber. The volume of oil so moved at each stroke being just sufficient to depress the punch E the proper distance, no further downward movement of the punch is possible as soon as the hole is cut. It will be clear that jarring of the parts is thus prevented and a steady and positive action obtained.

When the piston has completed the working stroke a slight turn of the valve F admits the air to the other end of the cylinder and equalizes the air pressure on both sides of the piston but the area of the stationary rod D being less than that of the tail rod C the ball piston is forced back in position for another stroke. This results in considerable air economy, the same air being utilized for driving the piston in both directions.

Owing to the peculiar construction and arrangement of the ball piston and the coacting parts it is impossible for any air to get into the high pressure passages unless the oil level in piston is permitted to fall below the top of the opening in the tail rod and in that case the piston must be refilled at once. This design eliminates an annoyance of some importance in the working of hydropneumatic tools.

The materials employed in the construction of the punch are of necessity carefully selected and a special alloy of aluminum is used wherever suitable, thus reducing the weight of the machine to a minimum.

THE TULA IRON CO. OF MEXICO.

Mexico, a magazine published at the City of Mexico, gives in its latest issue an account of the operations of the Tula Iron Co., which, it says, is manufacturing charcoal iron at $7.08 per ton. The property of this company is situated on a tableland in the Sierra Madre range of mountains, in the District of Syula, some sixty miles south of Guadalajara and about 300 miles from Mexico City, on the Zapotlan branch of the Mexican Central railway. The property covers 441 square miles of timber land. The land in the vicinity of the Tula Iron Co.'s plant lies some 8,000 feet above the sea level. The thermometer for ten months of the year ranges between 50 degrees at night and 70 degrees in the day. During the other two months there are occasional frosts at night, and the thermometer during the day usually ranges about 60 degrees.

Of this tract, 90 percent is timbered with approximately one-third each of scrub oak, white pine and white oak. The scrub oak is somewhat larger than that usually growing in the United States, the trees averaging about eight inches in diameter. The pine averages 24 inches in diameter, is very tall and straight and usually free of knots. The white oak is of a variety known as English live oak, and is very large, trees of 4 feet in diameter being a common sight in this country.

The property is composed of a 25-ton charcoal blast furnace, a well-equipped foundry with two 5-ton cupolas and suitable cranes, a rolling mill, two trains of rolls (9 and 16 inch), each provided with suitable engines for driving; four power hammers with heating and puddling furnaces, blacksmith shop, machine shop, pattern shop, saw mill, tools and general equipment. The buildings are made of brick with tiled roofs, and there are in connection with the mill six warehouses for storing charcoal, wood and finished material.

The employes are the mountain peons. From the pay-rolls of the company the following rates of wages are taken:

Puddlers, $1.58 for 2,000 pounds and all help; rollers, 56 cents per day; rollers (second class), 34 cents per day; bricklayers (chief), 28 cents per day; bricklayers (assistants), 25 cents per day; rough rollers, 34 cents per day; roll turners, 45 cents per day; labor boss, 23 cents per day; superintendent machine shop, 39 cents per day; molders (chief), 23 to 34 cents per day; furnace keeper, 45 cents per day; furnace

assistant, 23 cents per day; chargers, 20 cents per day; common laborers, 14 cents per day; boys, 3 to 8 cents per day; clerks, $18 per month; assistant superintendent, $27 per month; general superintendent, $90 per month.

The two mines of the company—known as the Ta Cotes and La Mora—are located about 20 miles from the mill, and the real worth of these mines is common knowledge in Mexican mining circles. The Ta Cotes mine is an open drift of black magnetite. The surface of the earth has been removed along an irregular course, approximately 1,000 feet east and west and about 250 feet north and south, exposing a bed of ore, the depth of which is not yet known. But it has been cut into vertically about 200 feet, and shows below the point uncovered about 400 feet. About 5,000,000 tons of ore are now in sight.

"*Mexico*," gives several analysis of the ore from these mines, which show from 64 to 68 percent iron; phosphorus, .48 to .055; sulphur, .3 to .182; manganese, .065 to trace; silica, 5.41 to 2.72. Concerning the plans of the company, the article says:

"For the present the Tula Iron Co. has all it cares to undertake in producing its regular line of goods, but it is believed to be only a matter of time when the company will take up the manufacture of barb wire, wire and reels. Recently the company has been offered an order for 20,000 tons of barb wire a year. The manufacture of sheets is another probability for the future, there being no sheets now rolled in Mexico. The present importation amounts to about 300,000 tons. Horseshoes, horseshoe nails and malleable-pipe fittings are all now imported, and could be produced at good profit by this concern. Still another probability is the manufacture of car wheels, the present consumption in Mexico being about 20,000 a year. The regular line of goods now being made by the Tula Iron Co. is: Merchant bar iron, sizes 4 inches square and round, and all sizes including flats and ovals to ¼-inch; castings, stoves, balcony and bench, anything up to five tons in one piece; wagon axles finished with skeins; sugar machinery, principally rolls; axes, pick axes, grub bars, chain and hooks, plow points, picks for miners and all special tools for cutting magey.

"Different methods of working, the peculiarities of the native labor and the conditions under which they labor, must be kept constantly in mind by any one wishing to gain anything like a correct idea of the atmosphere surrounding a community similar to the Tula Iron Co.'s property. To the sightseer, such places possess a peculiar fascination; and few spots in all Mexico have more of value for the student of metallurgy. Here we find an enterprise that has Mexican resources and labor for a background, with the more modern methods of other countries to render the product more profitable. This is the combination that is reclaiming the rich spots of the Republic. It is another splendid example of American energy in Mexico, and one which promises unusually large returns."

AMERICAN STEEL FOUNDRIES.

The governing committee of the New York Stock Exchange last week struck from the list of securities traded in on the exchange the common and preferred stocks of the American Steel Foundries. The statement posted on the exchange says that it appears from the report of the committee on stock list, this day submitted, that misrepresentations of an important character relating to the financial condition of the American Steel Foundries at the time of its application for the listing of its common and preferred stocks upon the exchange in November, 1902, were made to the Committee on Stock List, in support of said application.

Jones, Caeser & Co., accountants for the company, made the following statement: "The mistake rose out of a misunderstanding between the accountants and the counsel representing the American Steel Foundries [Max Pam] as to the amount of working capital which the vendors were to provide under the terms of the purchase contract, and as a result of this misunderstanding the balance sheet which the company adopted as a basis on which to open their books contained the error of $500,000, which was not discovered by the company until four months after the stock had been listed on the New York Stock Exchange and seven months after the formation of the company. As soon as the error was discovered it was corrected. In our opinion there is no question of fraud, no ground for any suggestion that $500,000 has been misapplied or misappropriated, nor for the suggestion that any intentional misrepresentation was made by the company to the Stock Exchange. The published balance sheet on July 31, 1903, is a correct statement of the company's position, and its position since has not been in any way detrimentally affected by the error which occurred."

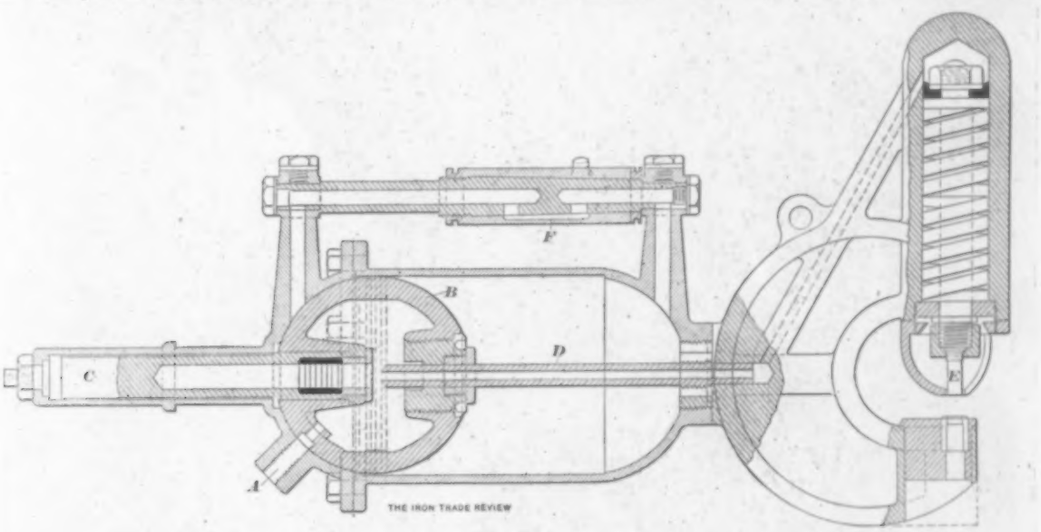


FIG. 2.—SECTIONAL VIEW OF CASKEY PUNCH.

W. H. Granbery, chairman of the governing committee of the exchange, made a statement in part as follows:

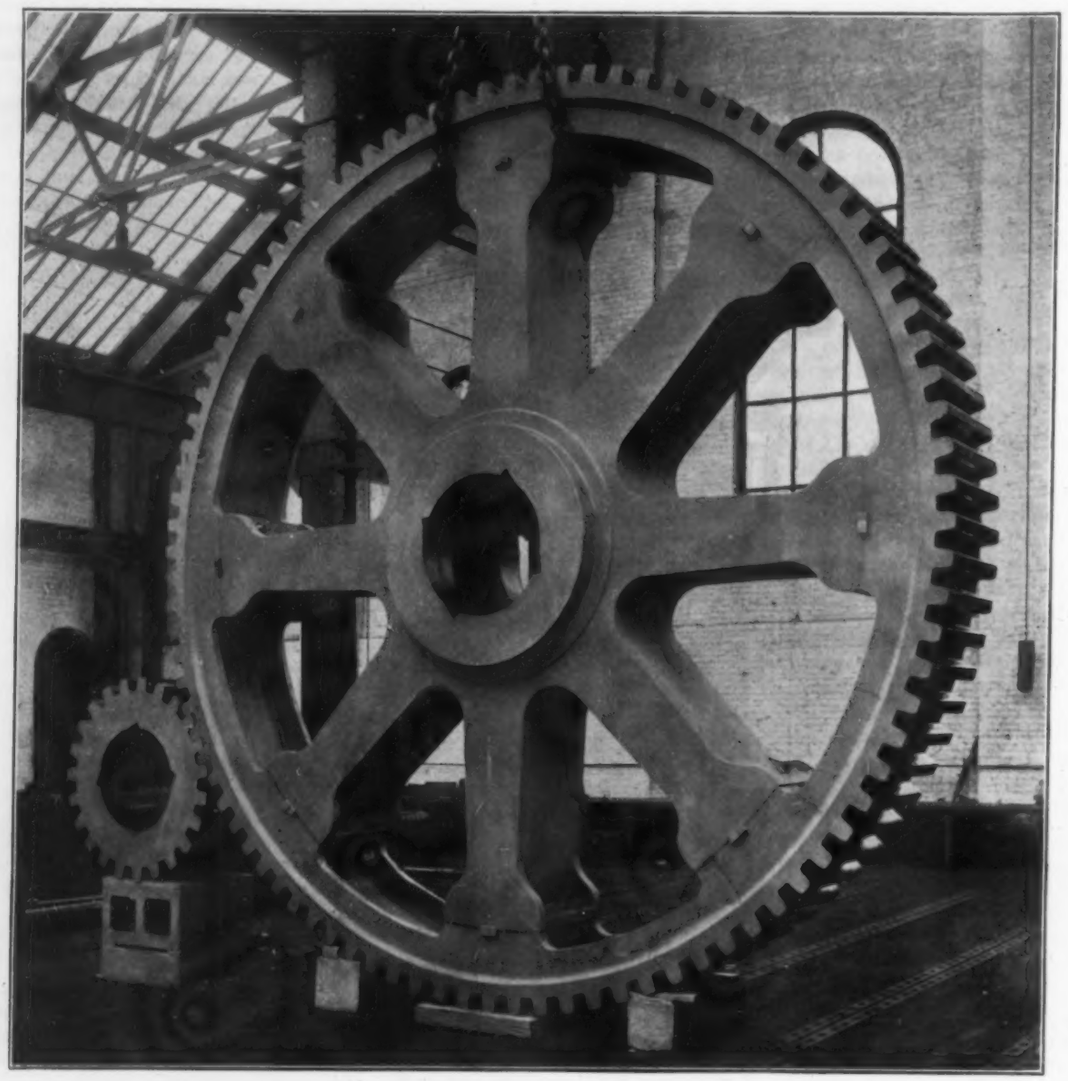
"The stock was listed on Nov. 26, 1902, on the strength of the representation then made by the officers of the company to the committee. Very shortly after such listing, namely, in January or February, 1903, question was made by some of the directors of the American Steel Foundries as to the validity of the claim of $500,000 represented on the company's books as being still due from the vendors. Final action in regard thereto was taken by the directors in May, 1903, canceling said alleged claim against the vendors, and at the same time the directors adopted a resolution directing that the Stock Exchange should be notified of the error and of the correction. The attention of the Stock Exchange was not in any way called to this alleged error or to its correction, until six months later, namely, November, 1903, when the American Steel Foundries made application for listing an additional $500,000 of its capital stock. The inquiry of the committee on stock list has been in progress for more than two months. As a result, the committee also learned that the balance sheets submitted to the committee

on stock list as of July 31, 1902, and Sept. 30, 1902, and printed in the stock list circular, were not those originally prepared by the accountants, but that, acting under special instructions, the accountants did specially revise such original statements, both in regard to current assets and current liabilities, for the purpose of presentation to the committee on stock list in support of the original application for listing American Steel Foundries stock."

It is understood that the directors of the American Steel Foundries will endeavor to have its stock relisted by the stock exchange.

LARGE SPUR GEAR FOR MILL SERVICE.

The firm of Scott & Hodgson, Ltd., of Guide Bridge, England, builds steam engines up to 3,000 h. p. and blowing engines to 100 inches diameter of air cylinder. Some recent work for export to Japan included a large spur gear and pinion for rolling mill service. The gears are illustrated and comprise a spur gear with cast iron center and steel rim and a pinion finished from a solid forging. These are 17 feet 3¼ inches diameter and 4 feet 3¼ inches diameter respectively, both are 7 inches pitch and 30 inches wide on the face. The steel rim of the spur gear is in one piece and weighed 21 tons, the weight of the cast iron center was 18 tons. The teeth of rim and pinion were milled to correct shape and pitch by the firm's specially designed machinery which is capable of dealing with gears up to 26 feet diameter.



MACHINE CUT GEAR OF LARGE DIMENSIONS.

The Elwell-Parker Electric Co., of Cleveland, says: "We have pleasure in saying that our business of the year just closed and with reference to our own particular business, has not been unsatisfactory with the exception, of course, that there has been a marked falling off in orders during the last three or four months. On the other hand new inquiries and the general outlook for new business are altogether promising and we feel that we are going to do as large a business in the coming twelve months as during the last year. We cannot discern deep-seated pessimism on the part of buyers or business men in general with whom we come in contact. There is simply a feeling that business in general is taking a rest, as it were, and preparing for active operations that are to extend through the present year, but more especially through the year after the coming elections."

McGeorge & Sons, Engineers.

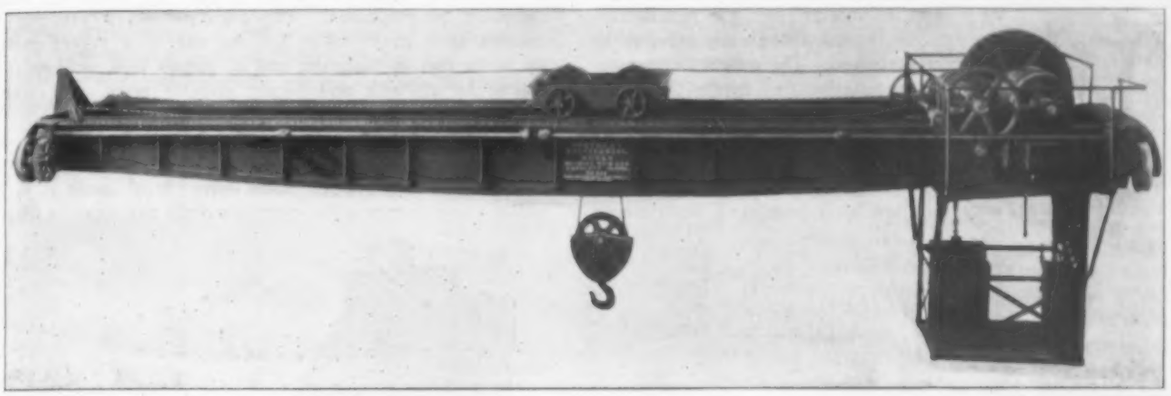
McGeorge & Sons is a new engineering firm whose offices will be opened in Cleveland, March 1, at 501 Citizens' Building. John McGeorge, consulting engineer with the Wellman-Seaver-Morgan Co., is the head of the firm and actively associated with him will be his son Ernest McGeorge, heretofore of the draughting department of the Wellman-Seaver-Morgan Co. A general engineering business will be carried on and a specialty will be made of power plants of all sizes and of the engineering of office buildings. Mr. John McGeorge will still maintain a consulting relation with the Wellman-Seaver-Morgan Co.

The Ashland Steel Range & Mfg. Co., Ashland, O., has completed its foundry, and in accordance with its agreement with the Board of Trade of that city, has received a deed for its property. The foundry employs 37 men.

ELECTRIC CRANE FOR PIPE FOUNDRIES.

The illustration shows a special three-motor electric crane designed for service in pipe foundries. It is designed for working over a pit and differs from the ordinary three-motor crane which carries the hoisting mechanism on the trolley. In this crane the hoisting and traversing mechanisms, together with the motors actuating them, are all located at one end of the bridge away from the dust and heat of the pouring pit.

This design also permits the load to be rapidly lowered when desired under the control of a large band brake operated by the man in the cab. A feature especially desirable in handling



THE NORTHERN ENGINEERING CO.'S CRANE.

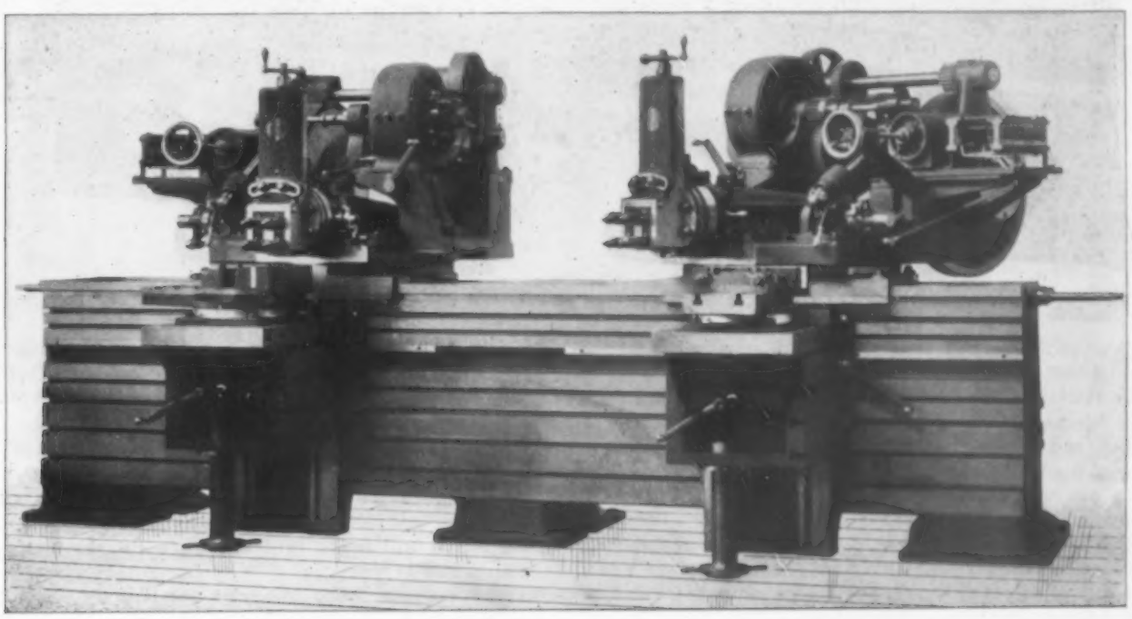
core barrels and flasks in pipe foundries. A lowering brake is also provided operated by the hoisting motor, and a powerful electric solenoid brake is furnished to stop motor when the current is cut off, this brake having also sufficient power to hold the full load independent of the other brakes. The construction is heavy throughout to meet the severe conditions of pipe foundry service. The principal gears and pinions are of steel with cut teeth. The truck and trolley wheels are also of steel and all drums and sheaves have unusually large diameters. The motors are very large for the work and are enclosed to protect them from the dust. The crane was designed and manufactured by the Northern Engineering Works, Detroit, Mich.

The recent increase of capital of the International Heater Co., Utica, N. Y., is for the purpose of retiring indebtedness equal to the amount of the stock to be issued, and when this is done, which the company expects will be within the next thirty days, it will be free from debt. The transaction simply means an exchange of stock for some time loans.

TRAVERSE SHAPER WITH SWIVELING SADDLES.

The machine illustrated is a 24 in. x 14 feet double head traverse shaper with swiveling saddles, and is designed for simultaneously machining the two ends of steel beams or similar work and at angles from 45 to 90 degrees. The tool is unique; so far as known it is the first shaper built with this swiveling saddle feature. Each head is driven by an individual motor and each motor not only operates the ram but all feeds as well, including the longitudinal feed to the saddle (slow for cutting and fast for traversing), and the power down feed to the head, which may be vertical or at any desired angle. There is also a hand traversing feed to the saddles through the horizontal screws, one end of each of the latter being shown at opposite ends of the bed. There is a hand down feed to the head and a rotary feed by hand to the heads by means of the crank wrench (shown on the right hand head) through worm and worm gear. Micrometer collars reading to thousandths of an inch are on the feed screws in heads, also on the traverse screws of the saddles.

The bed is wide and deep, and is strongly ribbed, making it extremely rigid. The face of the bed is provided with tee slots and forms a true vertical surface, to which work may be directly secured. The saddles, carrying the rams, have long and wide bearings, both on the bed and for the ram, and are provided with taper gibs for taking up wear. They are operated by full length and separate screws; consequently, the rams may be operated independently and with the saddles close together, even at either extreme end of the bed. The rams, being separately driven, are independent of one another. Being operated by Whitworth motion, they have a quick return, and



A 24-INCH DUPLEX SHAPER WITH SWIVEL SADDLES.

on account of their design have great stiffness and ample wearing surfaces. They are also provided with a rack and pinion for adjustment both for length of stroke and position over work.

The motors and the controllers for operating them are carried on brackets bolted directly on the saddles and as all feeds are manipulated from that point, the workman with the controller thus located is in a position to exercise full control over the machine from one position. The longitudinal feeds, both slow cutting and fast traversing, are obtained by systems of gearing connected to nuts engaging on the longitudinal screws, a bevel gear train transmitting the motion from the swiveling saddle to the traversing saddle.

The motors in the present instance are each 5 h. p., Crocker-Wheeler multiple voltage 3-wire type, though any other make of motor might have been employed. The weight of the machine is 27,500 lb. net. It is manufactured by the Cincinnati Shaper Co., of Cincinnati.

The C. O. Bartlett & Snow Co., of Cleveland, says: "We are well satisfied with this month's business; we are now running 10 hours a day and are fairly busy in all departments, and especially busy in some. Prices are extremely close; inquiries are coming in quite rapidly, and we can see no reason why this should not be a good year for all manufacturers. The labor question will decide the matter for the laborers, so-called, and if they are willing to expect a small discount in wages, a good business will be done, and we certainly believe they will have a large number of very intelligent people who fully understand and realize the situation, and fully know that a half loaf is better than none. Our export trade is increasing on account of lower prices. We are now having quite a good trade in Mexico and Russia, and a good many inquiries from the different countries of South America."

The Birmingham Iron & Steel Co., Birmingham, Ala., has succeeded to the properties of the Hood Machine Co., of that city. The property was purchased by J. R. McWane, of Lynchburg, Va., and W. T. Adams, of Corinth, Mass., who organized the Birmingham Steel Co., and will continue the foundry and machinery business begun by Mr. Hood, and in addition manufacture steel castings. W. W. Crawford has been made trustee by Mr. Hood to wind up the affairs of the old organization.

AN UNUSUAL GEAR CUTTING MACHINE.

Gould & Eberhardt, of Newark, N. J., have just completed for the R. D. Nuttall Co., of Pittsburg, what is said to be the largest entirely automatic gear-cutting machine that has ever been made. There have been larger machines built for this purpose, but they have all been semi-automatic, whereas the machine referred to is entirely automatic in all its functions, and after once being set and started, needs no further attention until the gear blank is completed. While differing in detail and construction from the smaller new type machines of the same make, the principles are essentially the same, so far as operation is concerned. The machine has a capacity for cutting spur gears only, by the use of a rotary cutter, up to 12 feet in diameter, and 24 inches face, and up to as coarse as 4½-inch and larger circular pitch, and weighs about 40,000 pounds.

Fig. 1 shows the machine in front of the shop and ready for shipment; the two sheave pulleys and the counterweight to cutter slide have been stripped. The pulleys and cutter slide counterweight are seen in Fig. 2, which presents a view of the machine taken from back end while on the first floor of the Gould & Eberhardt shop. The photographs had a rough appearance on the parts which are usually left with a bright finish. This was due to the fact that the parts were slushed with grease, and as the photograph (from which Fig. 1 was made) was taken on a cold day, the slush was chilled. The artist has done his best to reproduce the natural polish which will be in evidence when the machine is installed and at work.

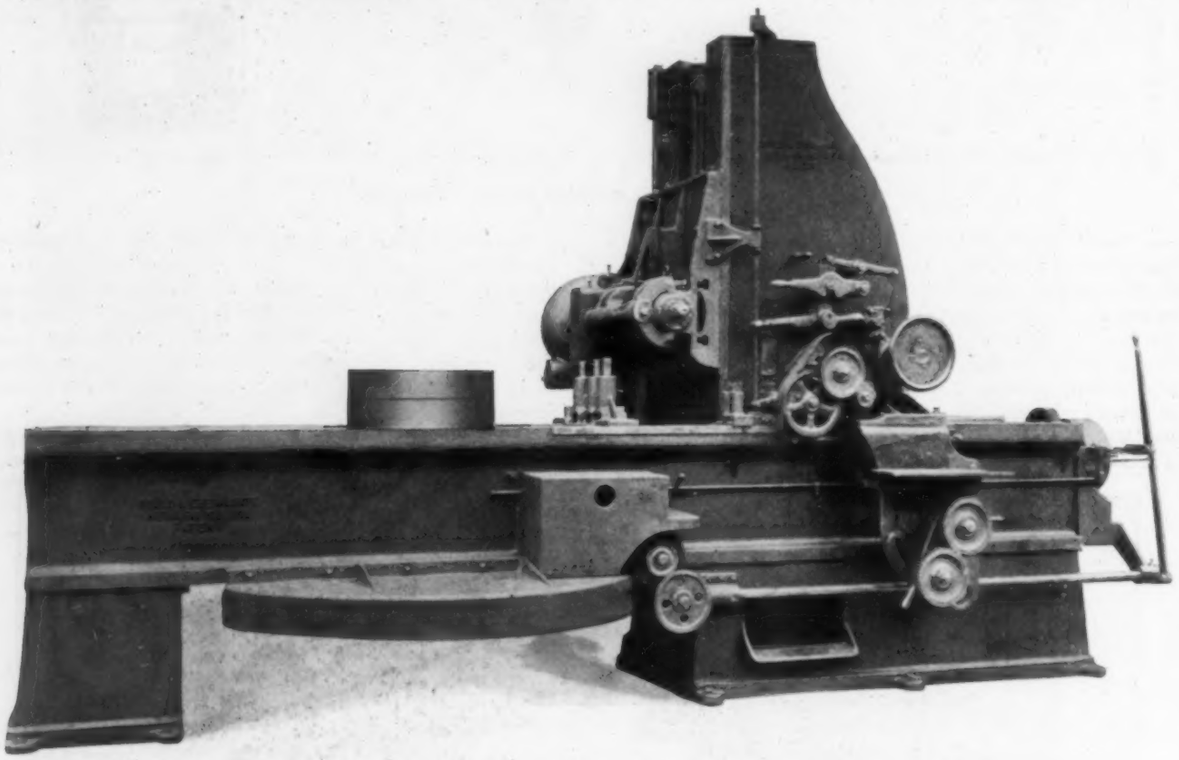


FIG. 1.—GEAR CUTTER AS STRIPPED FOR SHIPMENT.

The machine being designed for coarse pitch, heavy gearing, it is arranged so that the gear blank will lie down flat on the ways of the bed, instead of being supported on an arbor, between two upright columns, as in the smaller machines. This construction gives a very rigid support to the gear blank, and is laid out on the anvil principle, to carry the weight, take the strain of the cut, and absorb vibrations when cutting. The cutter slide works up and down in a vertical position, on an upright stanchion, which is movable longitudinally on the bed, either by power or by hand. The work barrel and arbor, as well as the worm dividing wheel,

are rigidly and securely fixed to the bed of the machine, and the positioning of the cutter in relation to the gear blank is obtained by moving the upright stanchion on the bed. Its exact movement to a fixed distance is located by means of a graduated dial and scale, with a stop which can be set at any predetermined point.

The cutter slide has a long and narrow guide flat bearing on the ways, and the bearings for the cutter spindle are heavily proportioned. The cutter slide is counterbalanced by a 3000-pound weight, held by two wire cables, which pass over double grooved pulleys mounted on top of the stanchion. The cutter spindle is driven by powerful worm and worm wheel drive, and in addition to the regular cutter spindle for using the large diameter, coarse pitch cutters, an auxiliary cutter spindle is furnished for using cutters up to as coarse as 1 diametral pitch. The worm dividing wheel is of large diameter, and is made of two halves, the same as with all of the smaller gear cutting machines made by

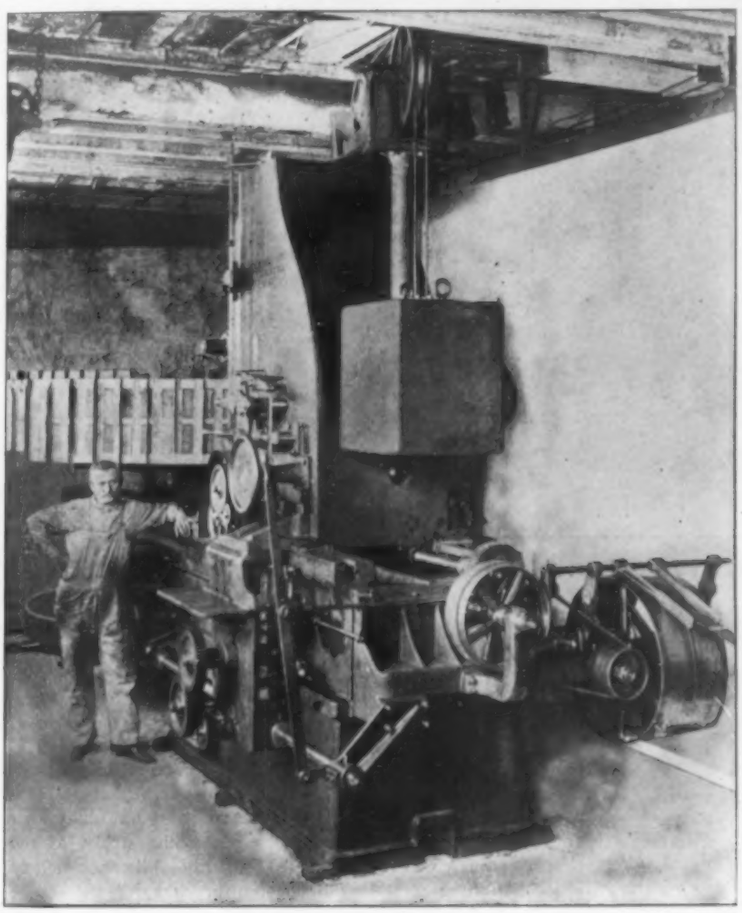


FIG 2.—MACHINE UNDER TEST ON FIRST FLOOR OF THE GOULD & EBERHARDT SHOP.

Gould & Eberhardt, and with the same accuracy. It is completely covered with a guard, to keep out all chips, dirt, etc. The metal chips produced by the cutter, and lubricant for keeping cutter cool, drop down directly into a compartment in the base from which they can be readily removed, the lubricant being separated by gravity, and flowing into a pocket or well from which it is again pumped to the cutter.

While divisions for the different numbers of teeth are arranged to be made entirely automatically through combinations of change gears, the machine is also arranged so that it can be operated semi-automatically and the dividing mechanism tripped by hand for each tooth, if desired. In a test made of a 10-foot gear blank cut in this machine the greatest error between any two teeth was .0015 inch.

Only one belt is used to drive the entire machine, and all movements are actuated through splined shafting and gearing. Each movement is complete in itself, and cannot take place unless all previous movements have been fully and correctly completed. A very essential feature of the construction provides that unless the division of the worm wheel is made complete, the cutter carriage cannot possibly feed forward. This always takes place entirely automatically, and requires no adjustment whatever, for any size of gear.

THE PROPOSED SOUTHERN CONSOLIDATION.

BIRMINGHAM, ALA., **Feb. 1.**—Considerable interest is still being taken in this section over the negotiations started recently looking to a consolidation of the Tennessee Coal, Iron & Railroad Co., Republic Iron & Steel Co. and the Sloss-Sheffield Steel & Iron Co., the three largest iron and steel corporations in the South. The negotiations conducted in New York were to be continued at a meeting scheduled for today in Birmingham, when the committees to investigate the values of the coal and ore properties and the mechanical plants of the respective companies were to be named. However, President A. W. Thompson, of the Republic Iron & Steel Co., was unable to reach Birmingham today on account of illness in his family, and the conference was postponed. Mr. Thompson will probably reach here Saturday or Sunday.

It is understood that Southern experts will find positions on the committees on values from at least one of the companies interested. It is rumored that Mr. Thompson, of the Republic company, will also represent to a certain extent the Tennessee Coal, Iron & Railroad Co. in the negotiations. It is believed here that earnest efforts will be made to bring the deal to a consolidation. The fixing of values may bring a decided hitch, but every movement is being closely watched as some such deal is believed to have in it the only real solution of the problem of Southern competition. In case the negotiations begin to show signs of promise, it is understood that officials of the United States Steel Corporation may take a hand.

J. C. Maben, president of the Sloss-Sheffield Steel & Iron Co., returned to Birmingham Saturday morning, Jan. 30. He stated that no pool or association of Southern iron manufacturers had been perfected at the meeting held in New York. He corroborated statements made concerning the negotiations looking to a consolidation between the three companies. His interview did not give much encouragement as to an early consummation of the deal.

W. G. Henderson has been appointed district sales agent for the Lackawanna Steel Co., with headquarters at 301 Citizens' Building, Cleveland. His territory will be Ohio and Western Pennsylvania. At present rails are the sole product of the company, but it is expected that the open-hearth department will be in operation in May and that deliveries can then be made of plates, structural shapes and bars.

At the annual meeting of the Decatur Bridge Co., Decatur, Ill., Jan. 25, it was decided to increase the capital stock from $30,000 to $50,000. The following officers were elected: President, T. L. Blackburn; vice president, G. A. Caldwell; secretary, E. E. Tyler; treasurer, W. M. Wood. Mr. Blackburn was selected for general agent, Mr. Tyler for general manager, Mr. Wood for chief engineer and Mr. Caldwell for superintendent.

Creditors of the Jackson Iron & Tin Plate Co., Clarksburg, W. Va., have forced that concern into involuntary bankruptcy, and a receiver will be appointed. Liabilities are placed at $375,000, assets at $400,000.

RECENT SHAPER IMPROVEMENTS.

The John Steptoe Shaper Co., of Cincinnati, has recently made a number of improvements in its product. The 16-inch crank shaper has been equipped with an automatic feed to the toolhead. This feed operates either up or down, the change from the one to the other as well as a complete disconnection being made by a quarter turn of a thumb screw. The shifting dogs are adjustable and are held by only sufficient friction to operate the feed. Should the feed be allowed to run to the limit of the screw no harm will result to the machine, as the dogs will automatically adjust themselves to throw the mechanism out of operation.

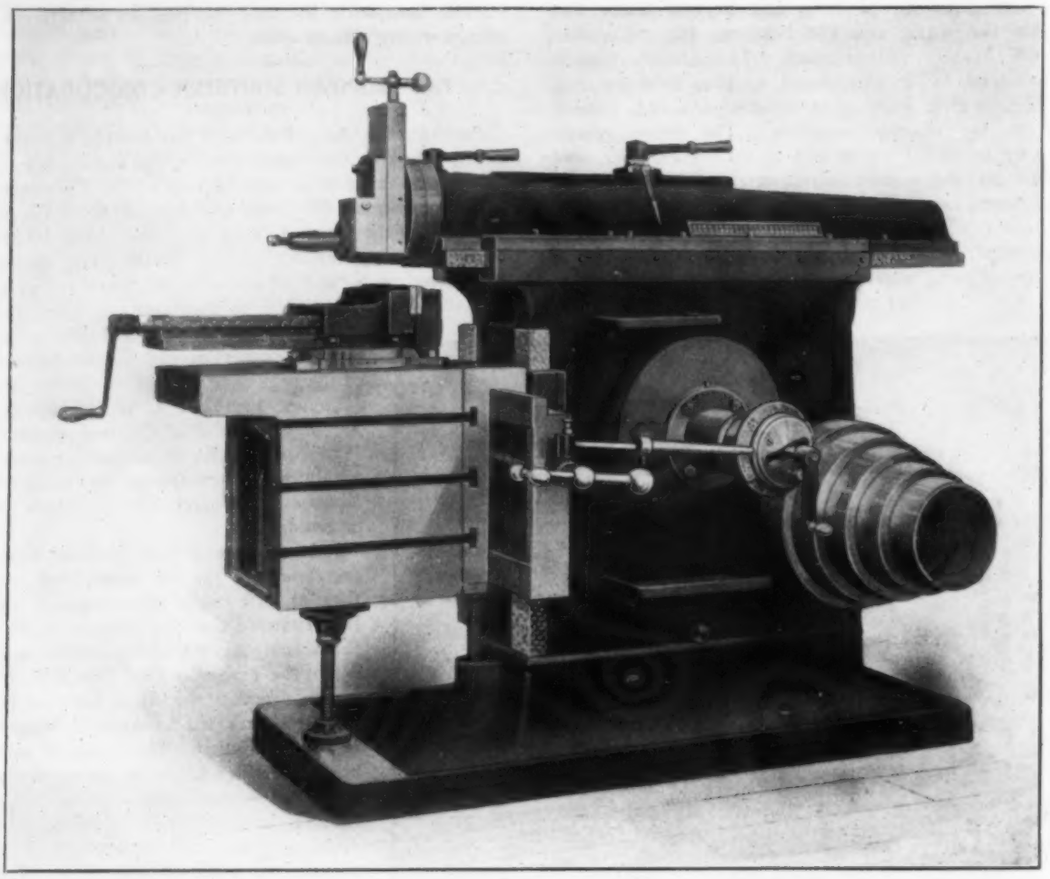


FIG. 1.— AN IMPROVED SHAPER.

FIG. 2.— TABLE SUPPORT FOR SHAPER.

The 25-inch back geared crank shaper has also received attention by the firm in the way of recent improvement and is here illustrated as Fig. 1. Many features are common to the two shapers, and a description of the general features of the one may well serve as an outline of the characteristics of the other. The 25-inch machine is, however, being furnished with a table support, which is best shown in Fig. 2, but which also appears in Fig. 1. This support is attached to the bottom of the table, is quickly adjusted to any variation in height by the hand wheel and firmly locked in position by the check nut. The base is swiveled and easily slides across the planed strip on the base of the shaper as the table is traversed. When the table support is not required, as in doing light work, the entire support may be drawn up closely under the table, the screw entering the latter.

The main features of the shaper shown may be described as follows: All flat bearings are carefully scraped to standard plates and all wearing surfaces are provided with gibs, susceptible of fine adjustments. Shaft bearings are unusually long and provided with liberal oil channels. The stroke of the shaper can be changed or adjusted instantly while the machine is in motion or at rest. The device for changing the stroke is self-locking, preventing any possible chance for the stroke to vary, while the machine performs its work. The ram is adjustable to suit the position of the work, and a short stroke can be had at any extreme or intermediate point. The machine can be operated either as a single geared, or as a back geared shaper. The change can be made instantly by means of a lever located on the back of the column, within easy reach of the operator. The opening under the ram will admit of shafts, of any length (and up to 3½ inches diameter), being passed through the column and key way cut at any intermediate point. The graduated index, showing length of stroke the machine is taking, is in plain view of operator. Feed screws are provided with micrometer graduations; a very desirable feature for use in cutting rack, duplicating key seats and similar work. The tool head can be instantly set and rigidly held at any angle by means of the lever shown. This draws the tool head squarely across the face of the ram and will not move while being tightened. The feed can be changed instantly while the machine is in motion. The plate is drilled and graduated to correspond with the teeth in the feed ratchet, and is so arranged that the feed can take place at either end of cut. The table is slotted on top and both sides. It can readily be removed and work bolted

to the slotted apron, to which the table is attached. Top of table measures 17 x 25 inches, and, being slotted its entire length, affords a very liberal clamping surface. The graduated swivel vise has steel faced jaws and can be used on the sides as well as on the top of table. Opens to 13½ inches; with jaws 2¼ inches deep and 12 inches wide.

The principal dimensions are: Length of stroke, 25 inches; automatic cross feed, 27½ inches; vertical adjustment of table, 14 inches; feed of tool block, 9 inches; cone pulley has five changes of speed for 3¼-inch belt; number of cutting speeds to ram, 10; length of ram bearing in column, 36 inches; countershaft has loose and tight pulleys, 14 inches in diameter for 4-inch belt; weight, 3,150 lb.

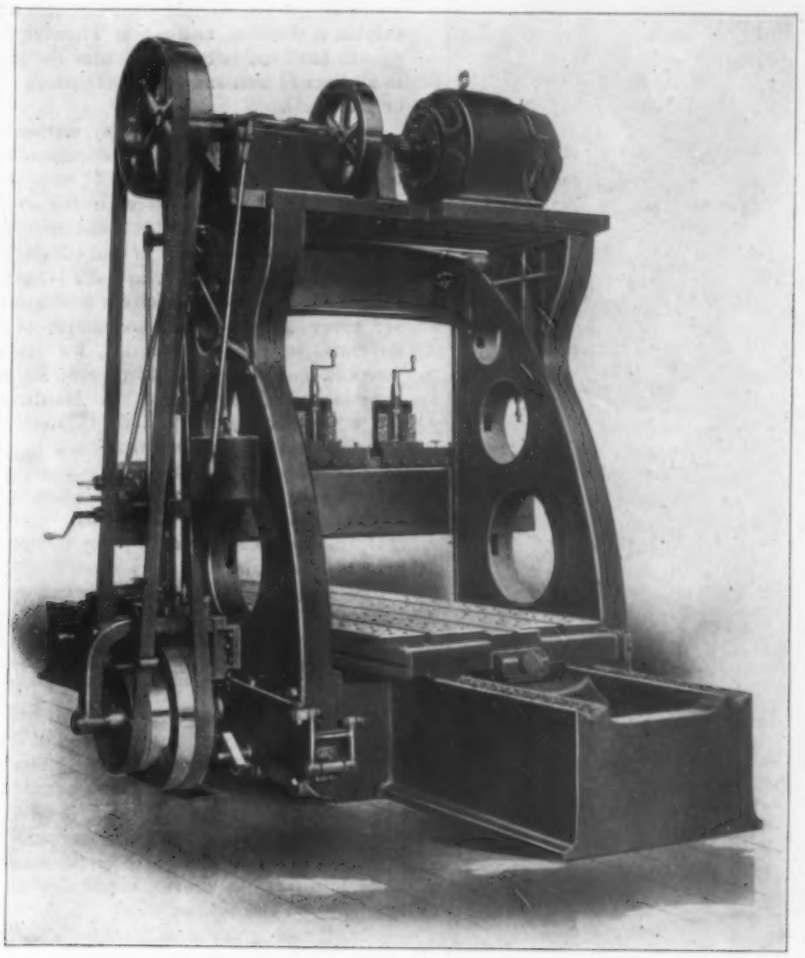
The West Virginia Steel Co., manufacturer of metal ceilings and corrugated iron, at Wheeling, W. Va., having defaulted on the interest on its bonds, the Wheeling Dollar Savings Co., trustee for the bondholders, has given notice that the property, including all real estate, machinery, stock on hand, etc., will be offered at public sale on March 12. The concern has apparently been doing a prosperous business for about eighteen years past. Frank G. Caldwell was the manager and principal stockholder. The amount of the bonds upon which default has been made is $37,000.

At Harrisburg, Pa., application has been made for a decree of dissolution for the Lochiel Furnace Co. The petition states that the company has no liabilities. The company was incorporated in 1871, and has not been actively engaged in business for some years. It formerly owned the Lochiel furnace at Harrisburg, now the property of the Pennsylvania Steel Co.

The Cleveland Stamping Tool Co. is not, at the present time, manufacturing any machinery. The trade on its regular line of goods has been very satisfactory.

THE CINCINNATI MOTOR-DRIVEN PLANER.

A motor-driven planer recently brought out has a variable speed cutting stroke, with a uniform return at all times and uses a constant high speed standard motor. The engraving shows how the power is transmitted from the motor to the rear or constant speed shaft by a pair of gears, one of which is rawhide to obviate noise. This first or constant speed shaft carries the return pulley and therefore gives the table always one speed for the return stroke. On this shaft is also mounted a heavy flywheel, to relieve the motor at the reverse, which is placed between two bearings, these being made ring oiling. The pulley for the cutting stroke is placed on a separate or forward shaft on top of the housing, and power is transmitted from the constant shaft to this one by two trains of gearing, each giving two speeds to the platen by simply moving one or both of the two levers shown on the side of planer. The changes can be made while the machine is in operation or standing idle. This makes an ideal drive, especially for large machines, when it is desired to place them under a crane or where there is no room overhead for any style of variable speed countershaft; and it also overcomes the two chief objections to a planer driven by a variable speed motor, which reduces the power on the slow speed and runs the return speed far beyond its limit when a high cutting speed is desired.



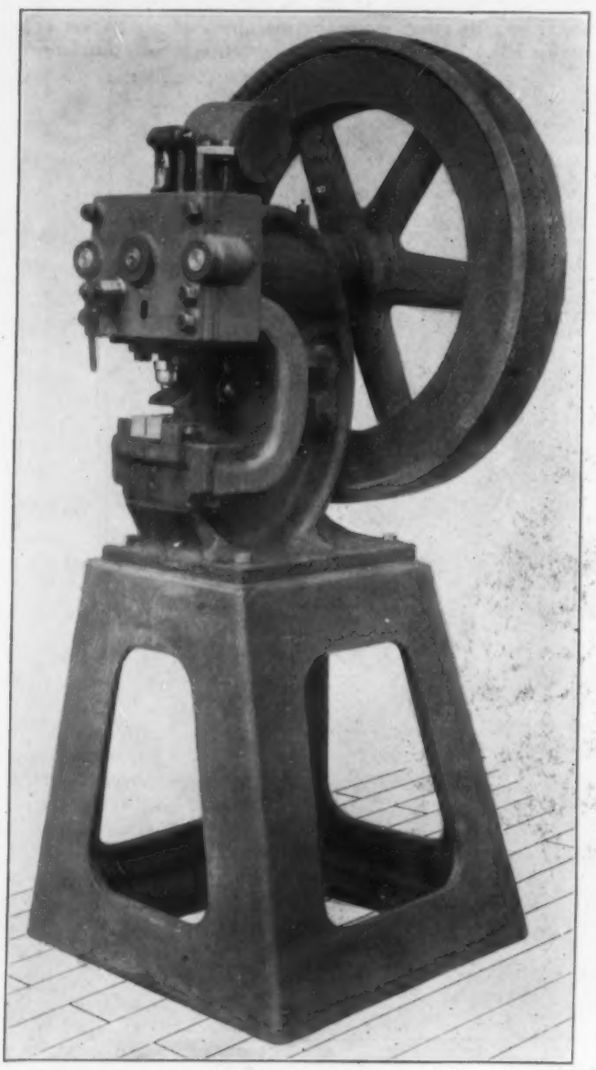
THE NEW CINCINNATI PLANER.

Variable speed motors are rarely carried in stock, and must therefore be ordered specially, which usually means a long wait, not only for the new motor, but also for any repairs should they be needed later on. The halftone illustrates a 48 x 48-inch planer, but this style drive has been applied to all other sizes of machines manufactured by the Cincinnati Planer Co., of Cincinnati. The speeds used on the machine illustrated were arranged for 20, 25, 30 and 38 feet per minute, with a constant return of 72 feet. A brass index plate is fastened to the side of the housing (but not shown in cut), so that a glance will tell what speed is being used.

THE CLEVELAND HIGH SPEED PUNCH.

The flywheel and shaft of this machine run continuously, and by means of an automatic gag which operates on the plunger only, the plunger at any stroke of the machine can be stopped at the highest point in its travel. The gag which is shown on the front of the cover plate is very quickly and easily operated by a small lever which throws out automatically. The punch can be operated by this means at a high speed without shock or jar. The punch holder and die socket are adjustable and the die block of the machine is so designed that all kinds of structural shapes, bars, plates, etc., may be punched. Shearing tools are readily substituted for the punching attachment. The machine may be removed from the cast iron base and mounted on a bench.

The maximum punching capacity is a ⅝-inch hole through



A NEW CLEVELAND PUNCH.

⅜-inch plate, or a ½-inch hole through ½-inch plate. The speed is from 60 to 70 strokes a minute. The frame is of the solid Cleveland type. The builders have discarded the clutch mechanism, which was found troublesome on a high speed punch, and have secured a means of operation which is quick and certain.

This punch is designed for use in small boiler shops, blacksmith shops and iron works where a low-priced tool is desired. It is built by the Cleveland Punch & Shear Works Co., and is handled by Joseph T. Ryerson & Son, of Chicago.

Five of the open-hearth furnaces of the Dominion Iron & Steel Co., Sydney, N. S., closed a few weeks ago for repairs, are now in operation. Extensive repairs are being made to other parts of the plant.

BASIC OPEN-HEARTH STEEL CASTINGS.*

BY L. L. KNOX, PITTSBURG.

All castings of any variety or form owe their conception and origin direct back to the metalliferous bearing ore. Said ore is treated by a reducing and smelting furnace producing pig iron. The further treatment, purification and manipulation of pig iron constitutes the metallurgy and science of castings. Pig iron without further alteration molded into different shapes gives that great body of commercial commodities designated as iron castings. Pig iron purified into steel is further used to give what is known as steel castings.

There is a wide scope for the discussion of the different methods of metamorphosing iron into steel. We will not enter such a broad field, but confine this article to a specific discussion of steel castings made by the process known as open-hearth, as the steel castings of commerce emanate almost solely from this source. The first authentic record of steel used commercially in the United States in the form of a cast steel article was in 1867, when the Wm. Butcher Steel Co., which is now the Midvale Steel Co., cast a frog for the Philadelphia & Reading railroad at Philadelphia. Since then its growth has been fully abreast with the gigantic strides made in all lines of iron and steel development in the United States or the world.

A study of conditions of today warrants the assertion that the field of usefulness and development for the steel casting is just being opened and utilized.

In 1901 there were produced in the United States, of Acid O. H. steel castings, 206,681 tons; in 1902, 255,475 tons; in 1901 there were produced in the United States, Basic O. H. steel castings, 94,941 tons; in 1902, 112,404 tons.

Steel castings not only have a field naturally their own but are usurping the former prerogative of iron castings. In structural material construction, for instance, bridges, blast furnaces, mills, large buildings, etc., the engineer is specifying steel castings almost entirely. Maritime construction turns out a vessel composed entirely of steel plates and castings. The desideratum of all construction is to obtain the maximum of strength with the minimum of material, and for such service this is more nearly approached with steel than with any other known or used substance.

Open-hearth steel is produced by two processes, namely, the acid and the basic.

The foregoing being preliminary, at this point I desire to enunciate the essence of this article—the purpose for which it was written, namely, the portrayal of the fact that basic open-hearth steel gives castings equally as good as acid open-hearth steel.

Castings can be and are being produced of shapely form, perfect homogeneity, possessing identical chemical constituency and filling all requirements possible to secure by the acid process, and at the same time at a far less cost. The acid process as indicated by the name, is affected through and by the use of acid reagents; that is, the vessel in which the steel is produced is lined with acid or silicious substances, such as silica brick, and to convert the charge into steel there is an acid reaction throughout.

The charge which goes into the acid open-hearth furnace must, *per se*, contain the number of molecules of phosphorus or sulphur which will exist in the finished steel product, as the acid lining will permit of the use of no fluxes for phosphorus and sulphur, without said flux likewise acting and removing the lining of the furnace. This carries the process back to its inception where metal bearing ores must be carefully selected and passed through the blast furnace with high grade fuels. The acid process then in reality resolves itself into a manganese, carbon and silicon eliminating process only. The analysis of the finished steel in phosphorus and sulphur is foreordained by the analysis of the pig metal and scrap charged.

The basic process, as indicated by the name, is effected through and by the use of basic reagents; that is, the vessel in which the steel is produced is lined with a basic substance, such as a magnesite, dolomite or calcite, or mixtures of the three, and to convert the charge into steel there is a basic reaction throughout. The charge which goes into the basic

* Read before the Pittsburg Foundrymen's Association Feb. 1.

open-hearth furnace can then contain higher percentages of phosphorus and sulphur than will be permitted or desired in the finished steel product. By the proper selection of basic fluxes for said phosphorus and sulphur, they can be eliminated in part or altogether and the basic flux will not affect the basic furnace lining. This carries back to the selection of ores for the blast furnace, where the same regard for selection does not exist as for the acid open-hearth process.

The iron ores which are suitable to be made into pig iron for the acid process are by no means numerous. They are costly and not widely disseminated; whereas for the basic process the ores to make the requisite pig iron are numerous, cheaply mined and widely disseminated. Therefore, the basic process can be far more generally practiced and at a corresponding lower cost per ton of finished product.

A resumé of the two processes would be as follows: The receptacle or furnace in each instance is practically the same, the difference being in the lining of the hearth of the furnace. The acid process eliminates manganese, silicon and carbon only. The phosphorus and sulphur are practically the equivalent of the initial charge, whereas the basic process eliminates all the ingredients above specified except silicon, which is very deleterious to this process. The silicon is a subject for the blast furnace treatment and can there be eradicated in part as a trisilicate of the slag bases. Therefore it follows that the basic open-hearth practice is a metallurgical stride forward and correspondingly requires better management—that is, chemical and mechanical knowledge and practice. Leaving entirely the domain of theory, it is an established fact that steel is now being produced of such chemical and physical structure that no chemical or physical determination will demonstrate by which process it was made, whether it is a product of an acid or a basic open-hearth furnace. This completely removes from the account the question, by which process was the steel produced?

In a regenerative or open-hearth furnace, the charge is exposed to the direct action of the reducing flame and when melted the carbon is also eliminated; to the resultant bath manganese is added and it is recarbonized, thus producing steel. To obtain the requisite heat, regeneration is practiced and for this purpose oil and natural gas are used, but the general practice is with producer gas and air, the air and gas being preheated. The construction of all open-hearth furnaces is similar, but no one form would be suitable in every instance, as locations and conditions give variations.

A brief description of the process in an open-hearth furnace using producer gas is given below:

The furnace is connected by flues with a series of chambers, said chambers filled with fire brick checker work. The furnace is further provided with flues carrying off waste products of combustion, also connections to a draft stack or chimney. The gas and air are led to their respective regenerators, there heated and through uptakes pass to the port of the furnace, where they are mixed in proper proportions to insure complete combustion.

The waste products of combustion then pass from the furnace and are utilized to heat the regenerators for the gas and air initially used, and further led to an exhaust stack. The regulation and manipulation of the gas and the air is brought about by a system of valves. These valves are termed reversing, as their function is to pass and to regulate air or gas as desired, and also to shut off or to reverse the said passage when so desired.

As already indicated, the regenerators play a specific part, and that is to preheat the ingoing gases and air. To accomplish this the chambers or regenerators must contain 60 to 100 cubic feet per ton of steel; as practiced in many instances 30 to 40 cubic feet capacity is installed, which is completely inadequate. The form or shape of the regenerator is just as important a factor as its cubical contents, because heated air or gas is thereby expanded in volume and has a buoyancy or tendency to ascend; and the two regenerators may contain identical internal area, yet the one which is built with a less basal area and greater altitude has followed nature's law of ascent, and is far more efficient than the one built with a greater basal area and less altitude.

Nature's behests must be obeyed or there are disastrous effects; and when a regenerator is constructed without compliance with the natural law of gaseous heat expansion, the penalty must be paid in much larger quantities of fuel for regenerative purposes. The location of the regenerators in reference to the furnace itself is vital. This point will be considered later in connection with the furnace and ports.

As the heart sends the thrill of life through the human frame, so this part in open-hearth practice is taken by the valves, which regulate and control the passage of the air and gases, representing the prime requisites for proper and economic open-hearth practice. In many instances the valves employed are of the common butterfly type, which become warped with heat, thereby failing to seat or form a gas seal when closed. The gas thus escaping to the chimney without performing any work is a direct fuel charge per ton of product.

A perfect valve does not exist, but there are valves which approach the requirements in not warping, being water cooled and always seating, being gas sealed when seated, simple in construction, easily accessible and quickly reversible. The writer has given this subject much thought and might mention several valves which meet many of the requirements.

The term ports is used to indicate the openings into the furnace through which pass the incoming preheated gases and air, and at the same time by the shape and location of said ports direction is given to the gases and air. The waste products of combustion pass off through the ports. To fulfill the mission for which they are constructed, the ports should be sufficiently long and properly located to give the desired direction or control of the entering gases and air. In many instances the ports are simply holes in the wall without length or location and the entering volume of gas and air has no predetermined direction or course, being liable to strike and destroy the side walls or roof instead of the surface of the charge. The uptakes are conduits for carrying the gas and air from the regenerators to the ports and vice versa. The main feature is to have ample internal area.

The slag pockets are receptacles to receive any slag issuing from the ports, and should be located at the base of the uptakes, independent of and away from the regenerators; whereas in general practice these pockets are located in the checker work in steel foundry practice. The regenerators should be located directly in the rear of the uptakes and slag pockets away from and independent of the furnace itself.

Having considered partially the accessories of an open-hearth furnace, such as the regenerators, valves, ports, uptakes, and slag pockets, we pass from this anatomy of the heart and lungs to a brief consideration of the frame, the furnace proper.

No structure, whether of minute or of more pretentious proportions, is constructed without first getting a foundation. The open-hearth furnace requires a compact, rigid and solid foundation. As generally practiced by steel foundries, this elementary engineering feature is turned upside down by setting the hearth on top of the regenerators, which is paramount to placing the hearth on a foundation subject to great variations in temperature, subject to equal variations in contractions and expansions; in other words, using as a foundation nothing of compactness, rigidity or stability. The hearth, besides resting on a solid foundation, should have about nine square feet per ton of steel produced, and the form or shape thereof should be such as to facilitate the most perfect combustion possible of the gases and air, utilizing the heat units thereby evolved.

There are numerous details yet to mention, but there is one of such importance that we must in justice refer to it—the furnace doors.

A well-constructed furnace should contain charging doors, also doors on the tapping side, which are used to repair the bottom, also to examine the workings of the furnace. These doors should be water-cooled, thereby prolonging the life of the furnace lining and hearth, also increasing the usefulness of the furnace operators. In general steel foundry practice doors are installed only on the charging side and are not water-cooled. It would be hard to design a poorer furnace than is in general use in the steel foundries of today. This is caused partly by ignorance and partly by the necessity put upon the engineer of submitting plans for the cheapest first cost furnace in which steel can be made.

The rod mill of the National Wire Corporation, New Haven, Conn., has been closed down temporarily.

LAKE SUPERIOR IRON MINES.

Mr. L. W. Powell, who has been assistant to President T. F. Cole, of the Oliver Iron Mining Co., has just been appointed vice president of the Pittsburg Steamship Co., with headquarters at Duluth. Mr. Powell was in charge of operations of the Pittsburg Steamship Co., when it was a Carnegie company, and is thoroughly versed in steamship operations. As assistant to President Cole, of the United States Steel's mining operations, he has had much of the detail work on his shoulders, and has had thorough training in mining operations, being for years manager of the Palms mine.

M. L. Fay and associates of Duluth, who are exploring on the old Taylor mine, at L'Anse, Baraga county, Mich., have taken in a diamond drill, to begin work at once. The Bessemer Iron Co., composed of Duluth and Houghton men, is sending in another drill and will be working with it next week. This company has pits 35 feet in ore and claims the prospects are very encouraging. Mr. Fay's work is being done under the auspices of the Tesora Mining Co., with Capt. Griffith in charge, while J. D. Wade is in charge for the Bessemer company.

Drill operations are under way for a Minneapolis concern, on section 17 T 58 R 20, a mile north of the quartzite outcropping that defines the bottom of the Mesabi formation.

The Northern Pacific Railway, which under the name of Lake Superior Co. controls the old land grant of the St. Paul & Duluth railway, has stopped drilling on the latter's lands in T 55 R 12, where it has been working all winter. Nothing was found.

A little ore has been found in what are called the Turney lands, in section 24 T 58 R 18, which had been drilled fruitlessly some time ago by Cleveland parties. Though the present find is made much of locally, there is no indication yet that it amounts to much.

The Duluth & Superior Iron & Steel Co. has been organized in Minnesota and is trying to sell its stock throughout the State. The company claims in its advertisements to have a mine "with 150,000 tons of ore on the dump and to be able to mine this year 300,000 tons at a profit of $1 a ton." This "dump," the president of the company admits, is at present "covered by from 10 to 15 feet of gravel, but it can be taken off easily." The property is a part of the sw ¼ of section 15 T 59 R 14, 1½ miles east of the Duluth & Iron Range road, which was explored by D. T. Adams last summer, and on which he found what he thinks may amount to 225,000 tons of ore in all.

A good deal of mine timber is being placed at the Miller mine in section 4 T 58 R 15, Mesabi range, which is owned by the Pitt Iron Mining Co. This property was opened last fall and closed down at the beginning of winter. New boilers, a large Prescott pump, and other equipment will be placed soon.

The Longyear Mesabi Land & Iron Co. is drilling on section 3 T 58 R 15, and is said to have made a good find. Several holes are in ore. This company is preparing for a townsite on section 10, in opposition to the village of Aurora, which was started last fall, and has been drilling the ground to find if it contained ore. One very remarkable hole has been completed, more than 1,068 feet deep to granite, the upper 700 feet in surface and slate and the balance in taconite, with rich ore concentrations in the deeper taconite but too thin to be valuable. This rather goes toward a reversal of some of the accepted theories promulgated by highest authorities as to the formation of the Mesabi ore bodies and the concentration of Mesabi ores. Three drills are now working on this forty, and three more will be added soon.

At the Oliver Iron Mining Co.'s Monroe mine, Mesabi range, three shafts are sinking to the depth of 125 feet, where the first level will be started. They are down from 35 to 700 feet. A fourth shaft is to be sunk to the north of the others. This mine is being stripped rapidly for milling operations to one of the shafts. Considerable quicksand has been met in sinking and has bothered the company not a little.

Bristol mine, Menominee range, which had laid off half its men, is resuming full force, and will operate steadily indefinitely. The Commonwealth Iron Co. will also continue its explorations near Vulcan, which are quite satisfactory.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The William H. Snyder Co., Rutherford, N. Y., has been incorporated with a capital of $50,000 to manufacture steel and copper plates for engravers.

The Janney-Darnall Mfg. Co., Bloomington, Ill., has been incorporated with a capital of $350,000 to manufacture machinery.

The Simonetta File Co., Detroit, Mich., has been incorporated for the purpose of manufacturing and selling files, rasps, and other metallic articles, "and doing all things necessary to make the business a success." The capital stock is $25,000, of which $5,000 has been paid in cash. Eleven thousand dollars of the capital stock is represented by "the use of a secret and improved process for tempering files that is known to Rodolfo Simonetta and has been used by his family in Italy for many years." The stockholders are Eugene C. Whitney, Charles F. Berry, Henry J. Boerth and Rodolfo Simonetta.

The Marine Iron Works, Portland, Ore., have been incorporated with a capital of $5,000 to deal in engines, boilers, machinery and iron work and to conduct an iron foundry and machine shop at Portland.

The Oshkosh Tool Mfg. Co., Oshkosh, Wis., has been incorporated with a capital of $250,000 to manufacture tools and machinery.

The Robert Grant Co., New York City, has been incorporated with a capital of $5,000 to manufacture machinery.

The Southern Steel Car Mfg. Co., with an authorized capital of $500,000, has been organized at Ensley, Ala., where it is said a tract of 10 acres has been purchased, and that a plant will be erected. The first building will be 300 x 300 feet, two stories. Modern cars for street railways will be built. Virginia and New York capitalists are reported to be interested in the enterprise. W. G. Pilkinton, of Virginia, is president, and J. W. Gilliam secretary-treasurer.

The Corinth Engine & Boiler Works, Corinth, Miss., recently incorporated, inform us that they will be in the market in the next thirty to sixty days for complete equipment for their works. The company is considering the advisability of using electricity for power.

The Mayville Specialty Mfg. Co., Mayville, Wis., has been incorporated with a capital of $7,000, to manufacture foundry specialties.

The Chicago Smoke Consumer & Fuel Economizer Co., Chicago, has been incoporated with a capital of $2,500 to manufacture machinery.

The Bath Grinder Co. has been organized at Fitchburg, Mass., by John Bath and others. The company will manufacture emery grinders.

The Independent Iron Works Co., Lima, O., has been incorporated with a capital of $50,000. The incorporators are John Finley, D. J. O'Day, C. D. Finley, P. H. Mack and W. D. O'Neill.

The Hard Steel Fence Co., Cuyahoga Falls, O., has been incorporated with a capital of $10,000. The incorporators are D. R. Littlefield, E. W. Hamlen, M. E. Brown, G. W. Austin and F. S. Kryder.

The Standard Iron & Steel Co., Cleveland, O., has been incorporated with a capital of $5,000. The incorporators are H. A. Jackson, A. T. Hiller, J. H. VanDerveer, Lucile VaHue and Grace D. Reed.

The Caldwell & Drake Iron Works, Columbus, Ind., has been incorporated. Capital stock, $100,000. George W. Caldwell, president.

The Warren Independent Steel Co., Warren, Ill., is now permanently organized with the following officers: F. C. Taylor, president; L. C. Russell, vice president; J. L. Graham, secretary; R. C. Cullen, treasurer. These gentlemen and P. T. Hicks, Chas. Phillips and L. K. Buser are the directors. G. F. Hawkins is superintendent. The company will shortly be in the market for an engine and boiler, drop press, band saw, etc., and will have plans for building and power plant ready about Feb. 15.

Fires and Accidents:—

Concerning the fire which recently occurred in its plant, the Tarrant Foundry Co., Chicago, advises us that the newspaper account was greatly exaggerated and that the loss was nominal, necessitating only some small repairs.

Fire in the cutlery department of the Upson Nut Co.'s plant at Unionville, Conn., Jan. 28, caused a loss of $10,000 on machinery and $20,000 on building, nearly covered by insurance. President Upson, whose home is in Cleveland, is now in Unionville adjusting the loss.

At Louisville, Ky., Jan. 29, fire destroyed the Dupont warehouse. The principal losers were B. F. Avery & Co., plows; the Metal Ware Mfg. Co., and the National Metal & Machine Co. Total estimate of loss on building and contents, $80,000.

Fire at the plant of the Bucher-Gibbs Plow Co., Canton, O., Jan. 28, caused a loss estimated at $100,000. The fire originated in the stock rooms and partially destroyed the contents. As the fire was confined to the storage rooms, it will not be necessary to close the plant. The plant had not been in operation for several days on account of the death of the president, Mr. Cavnah.

The plant of the Reed Boiler Works, Bellingham, Wash., was totally destroyed by fire a few days ago. The loss was $7,000, half covered by insurance. The plant will be rebuilt.

New Construction:—

The Haberkorn Engine Co., Ft. Wayne, Ind., has spent about $10,000 during the past year in improving and enlarging its facilities, and its plans for this year involve larger expenditures.

The Illinois Steel Co. has ordered that work be resumed at the new cement plant at Buffington, near Indiana Harbor, Ind. A large force of bricklayers, structural iron workers, carpenters and laborers will be employed. Some of the machinery is already on the ground. It is said that the plant will be the largest of its kind in the world.

The Heppenstall Forge & Knife Co., of Pittsburg, successor to the Pittsburg Shear, Knife & Machine Co., has sold its machinery business to the Erie Foundry Co., Erie, Pa., and is now building a new forge plant, which will be one of the best equipped in the country. It will be fitted throughout with new hammers and all the machinery will be run by electricity. Contracts for this equipment have been let.

The Columbia Foundry Co., Cincinnati, whose plant was recently visited by fire, is at present considering rebuilding, but has not yet reached a definite decision as to how much money to expend, and as the weather is very unfavorable, the matter will remain open a few days longer.

The recent fire at the plant of the Northwestern Foundry & Supply Co., Detroit, caused a loss of about $15,000, fully covered by insurance. The part destroyed consisted of wareroom, machine shop and engine-room and covered 52 x 150 ft. The same is again under way of construction. The company is building the wareroom and machine shop considerably larger than they were, and is also adding thereto a wood and iron pattern department. It has its engine and blower installed and commenced active operations Feb. 1. It has many orders for future deliveries.

The Champion Blower & Forge Co., Lancaster, Pa., has erected a foundry, 60 x 300 feet.

The Congress Construction Co., Chicago, is about to erect a steel foundry building 90 feet x 215 feet at the Puget Sound Navy Yard, the structure being of brick construction with steel trusses and a copper covered concrete roof.

The Union City Foundry Co., Union City, Pa., recently incorporated, is building a foundry 105 feet x 50; machine shop, pattern shop, engine room, and an office, 90 x 50 feet. It has ordered all machinery and is equipping its plant with all the modern appliances for doing quick and first class work. The company's specialty will be the Barrett steam and hot water heater, shaft hangers, journal boxes, shaft couplings and collars, but will also do general jobbing work. The plant will be running about the first of April.

The Power & Machinery Co., of Cudahy, Wis., recently formed by the consolidation of the Loomis-Pettibone Gas Machinery Co. and the Holthoff Mining Machinery Co., contemplates making extensive improvements, including machine shops, foundries, a power house, etc. Secretary Lauzarder states that work will be begun at once, and about six months will be required to complete the buildings. The company is at present employing about 325 men, and will employ about 1,200 when the proposed improvements have been made. The company will manufacture the Loomis-Pettibone gas engines, the American Crossley gas engines, and will continue to make the Holthoff mining machinery.

The United States Malleable Iron Co., Toledo, O., has let the contract for its new buildings. The foundry will be 385 x 115 feet, the office and pattern shop 50 x 60 feet, and the storage room for patterns 40 x 60 feet. The entire cost will be about $20,000, and the work of construction will be pushed rapidly. The site is on the Belt railroad.

The Pittsburg and Valley Districts:—

The Amsler Engineering Co., with offices at 604 Empire building, Pittsburg, has been incorporated under a Pennsylvania charter with $50,000 capital. W. O. Amsler is president and A. C. Davis treasurer. The company will engage in blast furnace, open-hearth, melting and glass furnace engineering, and will also do general contracting for brick and concrete work. The contract for brick work for the new stack and stoves that will replace the old Emma furnace at Cleveland, O., has been awarded this concern by the American Steel & Wire Co.

The new sheet and tin plate plant of the Follansbee Bros. Co., of Pittsburg, which has been under erection on the West Virginia shore of the Ohio river opposite Mingo Junction, O., is nearing completion and will be placed in operation shortly. The plant contains four sheet and four black plate mills and the product will be sold through the jobbing house of this company at Pittsburg. The tin house is practically completed and when operations are begun the present tinning plant operated by this company in Allegheny, Pa., will be dismantled. William Banfield, formerly of the concern of Wallace, Banfield & Co., who operated a small four-mill tin plate plant at Irondale, O., and who became one of the district managers of the American Tin Plate Co. when the Irondale plant was absorbed, has been appointed manager and will operate the plant. About a year ago he resigned as district manager with the American Tin Plate Co.

The Kloman Co., Inc., engineer and contractor, with offices in the Keystone Bank building, Pittsburg, has been awarded a contract for the installation of a Kloman gas washer at the Struthers furnace, Struthers, O. Two hot blast stoves of the Kloman type will also be built at the plant of the Boyne City Charcoal Iron Co., Boyne City, Mich. They will be 15 x 50 feet.

The property of the Eleanor Iron & Steel Co., Irwin, Pa., was not sold at sheriff's sale on Saturday, Jan. 31, as was contemplated by the two largest creditors, the Liberty National Bank of Pittsburg and the Butler Land & Improvement Co., who hold claims of $38,000 and $10,500 against the property, respectively. The Fidelity Title & Trust Co., of Pittsburg, served notice that the mill equipment must not be sold, as it holds a mortgage on the property for bonds issued. The sale was then confined to some scrap that was lying in the yards and office fixtures which were purchased by the Liberty National Bank for $615.

This week the entire South Sharon plant, South Sharon, Pa., operated respectively by the Carnegie Steel Co., American Steel & Wire Co. and the American Sheet & Tinplate Co., was placed in operation with the exception of the tube, skelp and sheet departments. The tube and sheet mills have never been operated, and from present indications will never be operated as at present constituted. The open-hearth plant is on in part, while the rod and blooming mills are on in full. The wire plant is now operating double turn. Ten of the twenty tin mills are on in full.

The 10-inch mill at the Brown-Bonnell plant of the Republic Iron & Steel Co. is the only idle mill of this company at Youngstown, O., this week. At the Valley plant the 12, 16 and 18-inch mills were placed on in full on Monday, as well as the plate mill and the new puddle mill.

A break in the jacket of the McKinley stack of the Carnegie Steel Co., New Castle, Pa., has resulted in the blowing out of this furnace temporarily until repairs can be made.

Sheet bars for the Laughlin plant of the Whitaker-Glessner Co., Martins Ferry, O., will hereafter be shipped from the

LaBelle Iron Works, Steubenville, O., this arrangement having been entered into lately, and the two concerns will work in closer relations than heretofore. N. E. Whitaker was elected to the board of directors of the LaBelle Iron Works at the last meeting of that company's directorate, and this no doubt accounts for this arrangement. Heretofore the sheet bars for this plant were brought from the plant of the Portsmouth Steel Co., Portsmouth, O., which is also controlled by the Whitaker-Glessner Co., but as the freight from Steubenville is much less the sheet bars can be laid down in Martins Ferry much cheaper from Steubenville than from Portsmouth.

The finishing department of the Moorhead Bros. Co., Sharpsburg, Pa., was placed in operation this week, all the former employes having taken their former places at a reduction of 20 percent in wages.

The Bailey-Farrell Mfg. Co., Pittsburg, Pa., dealer in plumbers' supplies, has increased its capital from $350,000 to $500,000.

The Irwin Foundry & Mine Car Co., Irwin, Pa., owned by C. D. Sensenich and Louis S. Malone, will be incorporated under the laws of the State of Pennsylvania with $50,000 capital.

The copartnership between Emmanuel Dreifus and H. N. Trimble, under the firm name of E. Dreifus, Trimble & Co., dealers in iron and steel scrap, with offices in the Farmers' Bank building, Pittsburg, has expired by limitation and the business will be continued by Mr. Dreifus under the firm name of E. Dreifus & Co. H. N. Trimble has organized the firm of H. N. Trimble & Co., and will deal in iron and steel scrap, with offices at 1220-1221 Farmers' Bank building.

The Monongahela plant of the American Sheet & Tinplate Co., Pittsburg, Pa., which in addition to the ordinary tin mills contains the late Bray tinplate mill, was damaged by fire last week, the loss amounting to about $50,000. The damage was confined largely to the warehouse, the rolling mill machinery receiving little or no damage.

Twenty mills of the Shenango plant of the American Sheet & Tinplate Co., New Castle, Pa., resumed operations this week after an idleness of one week owing to the damage done by high water.

Furnace A of the Benwood plant of the National Tube Co., Benwood, W. Va., which has been idle for several months, was blown in last week.

Five hammers of the Howard Axle Works of the Carnegie Steel Co., Homestead, Pa., were placed in operation this week. This plant has been idle since the first of the year, but will operate in full very shortly.

The Cahall Sales Department, Pittsburg, of the Aultman & Taylor Machinery Co., Mansfield, O., has been awarded the contract for Fuels Building of the St. Louis World's Fair. The plant will have a capacity of 15,000 h. p.

At a meeting of the board of directors of the Standard Tinplate Co., Canonsburg, Pa., held last week, officers were elected as follows: Joseph Underwood, president; C. S. Johnson, secretary; J. V. H. Cook, treasurer; and W. H. Richards, general manager.

The new office building of the Wellsville sheet mill of the American Sheet & Tinplate Co., Wellsville, O., was badly damaged by fire last week.

The Best Mfg. Co., Pittsburg, Pa., filed a mechanics' lien against the Clairton Steel Co., Pittsburg, Pa., for labor and material, aggregating $3,900.

The Martin Hardsocg Mfg. Co., of Allegheny, Pa., whose plant was recently destroyed by fire, and who purchased the plant of the McKees Rocks Foundry & Mfg. Co. at a receiver's sale, has decided not to remove its plant from its present location in Allegheny, and the buildings and machinery of the McKees Rocks (Pa.) plant are now offered for sale. Property adjoining the company's plant in Allegheny has been secured and the plant will be entirely rebuilt with twice its former capacity. The output of the plant consists of mining tools and equipment.

General Industrial Notes:—

The Bellefonte furnace at Ironton, O., will start up again about Feb. 10, running on foundry iron.

The Adder Machine Co., Detroit, Mich., organized about two years ago with a capital of $200,000, has spent a large amount of money in perfecting its machine and will begin operations in about 60 days. The company states that it has orders for over 1,000 machines on hand.

The Morrison Foundry & Machine Co.'s plant at Youngstown, O., will be improved so as to reduce the cost of operation, and increase the output. Charles A. Stroh, formerly with the George B. Sennett Co., has recently become interested in the Morrison company.

The new furnace of the Alabama Steel & Wire Co., Gadsden, Ala., recently blown in, is said to be making a fine record. The first carload of iron was shipped to Studebaker Bros., South Bend, Ind.

The Union Iron & Steel Co. will start up its furnace at Ironton, O., on Feb. 8, and will make Bessemer iron.

The Sheffield Coal & Iron Co. furnace at Sheffield, Ala., has gone out of blast for repairs.

No. 2 blast furnace of the E. & G. Brooke Iron Co., Birdsboro, Pa., has been blown out. It is expected that repairs to No. 3 furnace of this company will be completed by April 1.

The 10-inch mill of the Diamond State Steel Co., of Wilmington, Del., has been placed in operation, after being closed several months. An accident to the 18-inch mill has resulted in its being put out of operation for repairs.

L. H. Field and Rayner Field have bought the interests of H. R. Stoepfel, N. D. Carpenter and A. E. F. White, of the Albion Engine & Motor Co., and have associated with themselves W. D. Brundage, who was formerly connected with the company as manager, and is an expert gasoline engine manufacturer. The business has outgrown its quarters in Albion and needed new capital in order to add to its capacity. It is the purpose of the new owners to move the concern to Jackson, Mich. The officers of the company are: President, L. H. Field; vice president and general manager, W. D. Brundage; secretary and treasurer, Rayner Field.

The Ewald Iron Co., Louisville, Ky., has renewed operations after being closed down for nearly two years. About 100 men were given employment.

It is reported that the German-American Steel Ballbearing Co., whose main plant is located in Germany, will locate a branch plant at Bayonne, N. J.

The Tyrone Iron Co., Tyrone, Pa., has suspended operations for an indefinite period. The plant has been partly idle for several months.

The Shirley Radiator & Foundry Co., with general offices at Indianapolis and foundry at Shirley, Ind., has just completed an additional warehouse 50 x 150 feet, and put in a duplicate steam plant, so as to be able to operate its foundry with either gas or steam. The company is running full force and has excellent prospects for business.

The sixth annual convention of the salesmen of S. F. Bowser & Co., Inc., Fort Wayne, Ind., manufacturer of the Bowser self-measuring oil tank, was held last week at the firm's office. Over 70 salesmen from all parts of the United States and Canada were present and participated in the discussions and all were given information regarding the latest improved outfits. The convention lasted for three days and terminated with a banquet at the New Aveline hotel. The menu card was prepared as a souvenir, the first page showing portraits of the officers and managers. The entire convention was most interesting and the salesmen go to their respective territories with new enthusiasm in their work.

A special meeting of the stockholders of the Altoona Foundry & Machine Co., Altoona, Pa., was held Jan. 20. A detailed report of the company's business was submitted, showing that it has been prosperous. Manager Hanright suggested the addition of a number of lathes, planers, and other machines to the machine shop. President Levan asked to be released as president of the company, but the stockholders were unwilling. They agreed, however, to hold another meeting, at which a vice president will be elected to assist President Levan.

The plant of the Ohio Rolling Mill Co., Findlay, O., will be sold Feb. 24 by order of court. The property has been appraised at $20,000, including buildings, six acres of land and all the equipment of the mill.